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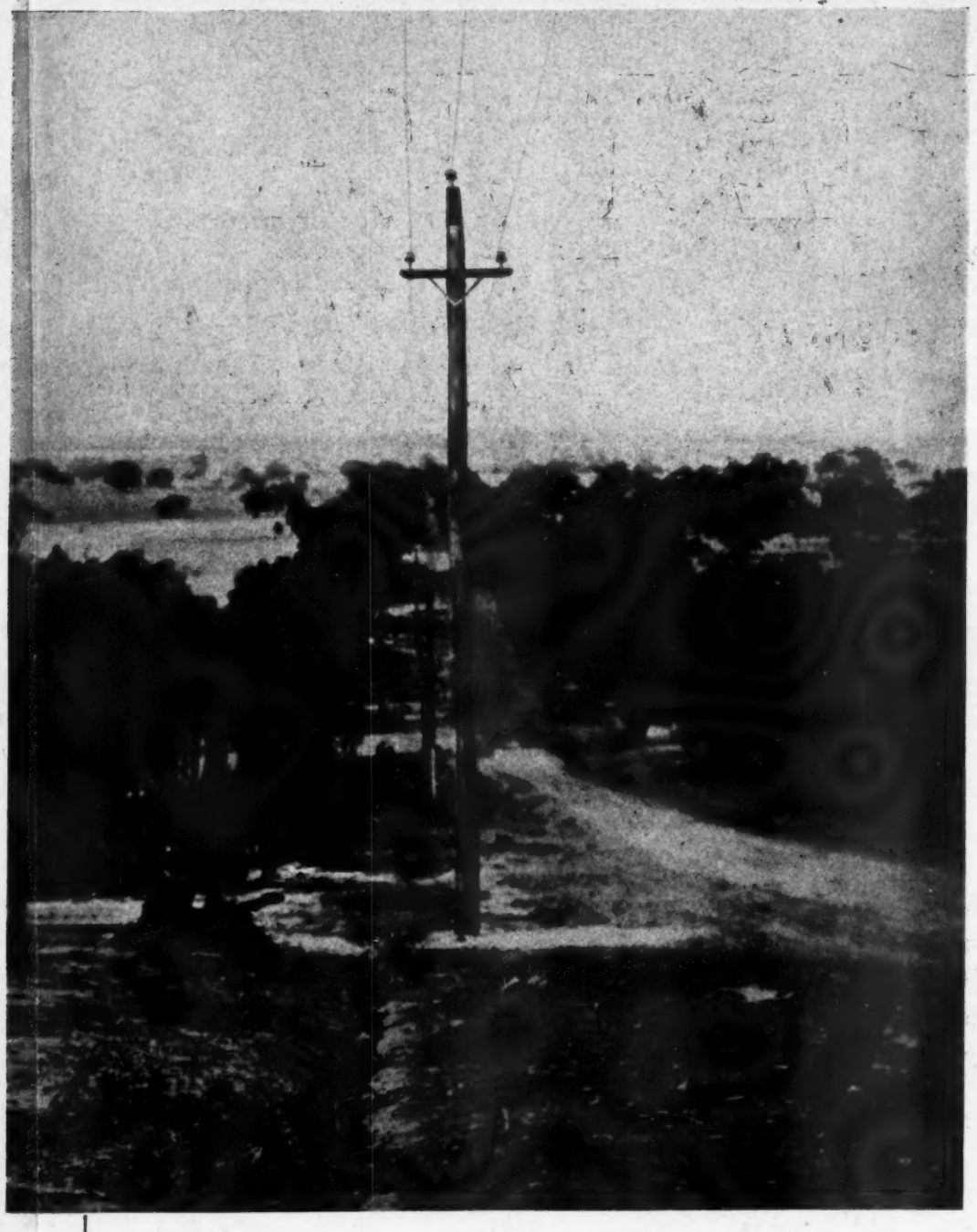

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The Power Companies' Policy

RECENT controversy on the virtues of large distribution areas has turned attention to the work of our more progressive power companies. The address given on Tuesday by Mr. Robert Armitage, chairman of the Yorkshire Power Co., to the shareholders, contains a clear statement of general policy which we believe is in line with that of other similar organisations.

First of all, recognition is paid to the importance of co-operation with the Central Electricity Board to work the national scheme. Although the Company expects no immediate substantial benefits from the grid, indirect advantages have already accrued, we are told, in the bringing together of all the undertakings in the district with the common interest of electrical development.

The consultative technical committee of the Mid-East England area, of which Mr. W. B. Woodhouse, the company's engineer and general manager, is chairman, should—as elsewhere—be of practical value to the Board. The power companies have done for years what the Board is now doing on a bigger scale. They have concentrated generation in a few efficient interconnected stations, closing down the smaller ones or obviating the necessity for their being built by affording bulk supplies, and have tapped sources of waste heat and of water power.

The economies in operating with a standard system and voltage obtained by the subsidiary Electrical Distribution of Yorkshire, Ltd., and the advantages of common tariffs over wide areas, give the company reason to hope that the smaller undertakings (many of which now take bulk supplies) will entrust it with the whole duty of distribution under a unified scheme.

The next point we notice in the speech is the prominence given to power supplies by which depressed industries can be assisted. Mr. Armitage points out that the success of the grid scheme can be hastened by industrialists giving preference to a public supply of electricity, and that energy can now be supplied for electro-chemical and metallurgical processes at prices that compare favourably with those obtainable in water-power countries. To obtain such loads involves risks, but the power companies, being free from local political influence, have not cut their lighting flat rates—a heresy which Mr. J. S. Highfield condemned at the A.S.E.E. dinner. They are therefore in a good position to take legitimate risks in fostering loads that yield a minute profit per kWh.

That the records of the power companies present so great a contrast to those of many Provisional Order companies is due, we believe, not so much to difference in the sizes of areas served as to the security of tenure enjoyed by the former. They can afford to wait for their returns, *e.g.*, from the development of thinly populated areas and from such actions as the contributions by the Y.E.P. to engineering training and research at Leeds University. But security is essential before a company can cast its bread upon the waters.

Domestic Possibilities

IN recent discussions on the distribution question reference was made to the large advance recorded in the number of electricity consumers during the past five years. The calculation was hazarded that if this rate was sustained all the houses in the country would be connected by 1938. It is just as well, however, to bear in mind the very obvious fact that new building work is going on all the time and that the rate will be accelerated greatly before long. There are large arrears to be made up, and great blocks of slum property which, as such, is not fruitful soil for electrical activity, will give place to buildings more likely to be fitted with modern domestic facilities. Then, again, as has frequently been stressed, there are hundreds of thousands of electrical homes where the radio and a few electric lamps form the entire electrical installation. We look hopefully to the next five years as the period in which householders will launch out, adding not only many additional lighting points but also

numerous heating and domestic power points and apparatus. The domestic distribution aspect is the one that demands a high-pressure selling push, intenser publicity work, and wide-spreading exhibition demonstration operations from a greatly increased band of canvassers and business-getters. But who can note without regret the fact brought out in one of the speeches at the Manchester contractors' dinner last week that salesmen are to-day "apt to neglect the existing consumer"?

The Consumer's Bill

WE are not justified in relying too much upon cheap electricity alone to sell itself, but we shall be unwise to ignore the fact that high charges are a serious obstruction to domestic advance. It is not always the small local authorities which are culpable in this respect, for there are substantial companies whose charges for lighting, power and cooking are prohibitive. Cases could be quoted of areas where tariffs offer no inducement to the average householder to exceed his few lighting points if he wishes to do so, and amid such conditions he is unlikely to be influenced by the undertaking by canvassers or publicity. Cheap electricity is the soil in which the business will rapidly grow, and growth of business makes cheaper electricity still more possible. If tariffs are high no amount of centralised propaganda, publicity and salesmanship can be fully effective; it can only touch a case here and there where the amount of the quarterly bill is not a matter of much consequence.

Critics of Electrical Enterprise

THERE will be mirth in the house of E. L. M. A. at the gas slogan quoted by the chairman at a recent gas company meeting. Fancy telling people in these days: "To preserve your eyesight, work and read by gas light"! Not less remarkable was the same gentleman's attempt to discredit electricity by recording that in twelve months there were seventeen fires in East London "due to electrical faults." He went on to belittle the importance of those electrical fires: "Fortunately they were quickly extinguished." He did not state the number of gas fatalities, but added his protest to that of other gas concerns which object to local authorities recognising the value of electricity when preparing housing schemes. The gas companies are so apprehensive that they have deposited a Bill in Parliament relating to the matter, but the electricity authorities have decided to offer strenuous opposition. The tendency in some housing schemes has been for electricity to be neglected, or for a few lighting points to be thought sufficient, with only one, if any, power points. We know a good many cases where the purchaser or tenant of houses erected in recent years has found gas fully installed and has had no choice but to adopt it or go to the expense of turning it out and substituting an electrical installation if he desired it. We hope that this attempt of gas concerns to hinder domestic electrical progress will be met with a more marked enterprise in installing plenty of power points in new houses.

The "Point Fives"

WHEN the virtues of low charges as a stimulus to electrical development are discussed, we always recall the work of that gallant band of pioneers—"The Point Fives," which existed from 1912 until 1915, when the war-time activities of its members caused its liquidation. After the war E.D.A. took up the work where the association left off. The credit for the formation of the Point Fives is due to the initiative of Mr. A. Hugh Seabrook, then engineer and manager to the St. Marylebone undertaking. With him were seven others (including Mr. J. Horace Bowden, who at Poplar was, we believe, in 1909 the first to introduce a halfpenny tariff). Possibly by force of example, the number was swelled by 1912 to twenty-three. In our issues of November 15th and 29th, 1929, we gave particulars of forty-four undertakings which had by that time adopted the rate. On another page of this issue we give the names of the members of the association. The list shows that men with the highest engineering qualifications have not regarded the selling side as beneath them. The same holds good of many of our best technical men to-day. In any case let us remember the slogan of the Point Fives: "All together, all the time, for everything electrical."

The Fair

THE British Industries Fair is now in full swing, and everything points to its being a greater success than ever. Since the ELECTRICAL REVIEW's efforts some years ago towards obtaining more adequate representation of the electrical industry at the Fair, the electrical section at Birmingham has never looked back, and this year's show is the best so far, but not so good as it could be. But the occasion is one for congratulation rather than complaint. If the progress of the industry be in proportion to the substantial increase in the new domestic electrical equipment introduced this year, our manufacturers and traders will indeed be fortunate. For the industrial and heavier classes of the electrical industry the problem of exhibiting is, of course, difficult, considering the short period of the Fair, but such stands as that of Babcock & Wilcox, Ltd., show what can be done in displaying heavier equipment. It is necessary to look outside the electrical section to obtain a true perspective of the position relating to industrial applied electricity. Every year the Castle Bromwich buildings have had to be extended, and, judging from reports that reached us regarding the failure of electrical firms to secure stand space this year, they will need to be further enlarged for the 1934 Fair. The enterprise of the Birmingham Chamber of Commerce is being abundantly justified.

Unteachable

LAST week we expressed a hope that the clearing of electricity from all responsibility for the fire on *L'Atlantique* would teach our lay Press a lesson. We were soon disillusioned. From the description of the all-electric *Queen of Bermuda*, which appeared in our last issue, one would have thought a visit to the vessel at Liverpool would have produced enough to interest the readers of our dailies. But the public is supposed not to be interested in striking examples of British electrical engineering, and half the space allotted to the subject in one paper is taken up by a reference to a fire on board "caused by a short-circuit." A correspondent assures us that there was no fire whatever at Liverpool—other than the electric fires which were fulfilling their legitimate purpose with every satisfaction. It is hard enough when electricity is unjustly blamed for fires that do take place; the introduction of short-circuits to pad out an "otherwise bald and unconvincing narrative" is a little too much.

To Inventors

"WHAT'S Wanted," a publication of the Institute of Patentees, gives a list of nearly eighty electrical devices that would meet various needs. Some of these requirements are a cry for the moon; some have already been met by manufacturers; others should be well within the compass of inventive ability. We fear that a lamp filament that will not burn out is unlikely to materialise, unless a gaseous discharge can be regarded as a filament; some day "a more efficient light from electricity" may be answered in the same way. A means of lighting a coal fire (without sticks or paper) by electricity would best be met by doing without the coal. There are many electric ovens for annealing metals, and our columns have contained descriptions of excellent a.c. starting switches. Also, thermostatically controlled electric cookers and irons are now on the market. Nevertheless, many of the other suggestions are worth following up. The inventor should not confine his attention to the electrical section, since there are many wants under other headings that can be fulfilled by electricity, such as that relating to a signal for road crossings operated by head lamps. Another application of the photo cell?

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A lucid expositor
The PRESIDENT greeted 700 arrivals!
PROFESSOR E.W. MARCHANT D.Sc.
LORDMESTON
President E.D.A.
has exchanged the punkah for the electric fan
The writing on the wall
"LIGHTS IN THE EAST"
MR. J.W.J. TOWNLEY
Borough Electrical Engineer W.HAM
Some good heads
MR. J.A. KENNEDY
THE G.O.M. of the INDUSTRY
COL. R.E. CROMPTON C.B.
MR. J.C. DALTON
Gen. Mg'r "Co.-po."
BARKING Power Station
Pres'd't. I.M.E.A.
"The Doc"
LT. COL. K. EDGCUMBE. T.D. R.E.T
CABLE EXPERTS
MR. G. PORTER
DR. E. BOWDEN
MR. P. DUNSHEATH
Spot somebody speaking French
MR. H. HOBSON
Commercial Manager C.E.B.
"A live wire" MR. V.Z. de FERRANTI M.C.
MR. P.F. ROWELL "Chief of Staff"
MR. A. NICHOLS MOORE
"How about a spot of distribution?"
DR. ALEXANDER RUSSELL, Principal of Faraday House
Making Progress in the Reception Lounge was easier for some — than OTHERS!

Some well-known people at the I.E.E. dinner **(See page 271)**

The Smaller Undertakings. By J. W. Simpson, A.I.S.A., F.S.S.

The I.M.E.A. Secretary defends the municipalities

THE article by Brig.-Gen. R. F. Legge, C.B.E., appearing in the ELECTRICAL REVIEW of February 3rd deals with the old question of company versus municipality. It will no doubt be challenged. There appears to be an impression that municipal electrical undertakings are less efficient than company undertakings. It is time the public mind was disabused.

As secretary of the Incorporated Municipal Electrical Association, which is representative of municipalities owning electricity undertakings in the United Kingdom, and also as a municipal official of long standing, I wish strongly to defend local authorities owning electrical undertakings, particularly the smaller ones, which are constantly the objects of attack.

Centralisation—For and Against

Many times it has been said that small undertakings should be abolished—in other words—centralise distribution! Before any drastic revision of the present methods of distribution can be adopted it will be necessary to ascertain what advantage, if any, will be effected in the operation of small undertakings. It is assumed, however, that the suggestion would be to take over the undertakings, lock, stock and barrel.

In a scheme of this magnitude, many important points would have to be considered. In small undertakings the manager is always in close personal contact with his consumers, and he is frequently able to obtain business on personal grounds. It may be argued that if a wider control were given this would not in itself greatly affect the position, but it is a fact that business to-day is obtained more readily by the personal relationship between the supply authority and the consumer.

It has been proved time and again that it is impossible in large organisations of the nature suggested to have the same personal and intimate contact with the various details of the undertaking, and I submit that decrease in efficiency is the result.

The institution of assisted wiring schemes and the general development of the domestic load add materially to the complications likely to arise in any scheme for the centralisation of distribution. It is also quite impossible to divorce the showroom and apparatus side of the business from distribution. In other words, it would become necessary to take over the whole of the undertaking, as accountancy and general policy are important factors which influence the development of any public supply.

Mr. J. W. Simpson, secretary of the Incorporated Municipal Electrical Association

The question of municipal trading is also always a bone of contention. It has been said that the expansion of municipal trading mainly arose from a desire on the part of municipalities to secure for themselves the profits and the control of monopolies—an entirely wrong conception. Parliament, in granting these so-called monopoly rights, attached conditions under which the powers conferred were to be exercised, in order to prevent them from working out to the prejudice of the public. It is pleasing to note that many undertakings have taken advantage of the powers granted them by Section 48 of the 1926 Act. This is another instance of the desire of local authorities to give efficient service.

Many of these "small" authorities are as highly efficient as the large power companies, but in the few instances—and it is only a few—where it may be argued that this is not so it must be admitted that the policy of the local authority is at fault. The default, however, of a few undertakings in this direction is not an argument for the absorption of them all in a scheme of centralisation.

Comparison of Charges

Municipalities play an important part in the supply of electricity. According to the last published figures municipalities were responsible for:—

(a) Of the total number of consumers connected to supply systems—72.4 per cent.
(b) KWh generated—59.8 per cent.
(c) KWh sold—61.7 per cent.

The charges made by municipalities can be favourably compared with those of the companies—in addition it must not be overlooked that the rate-payers, as a whole, in many instances receive a bonus in the form of a contribution to rates. This, however, is not the material point at issue, but it should be borne in mind when criticising small municipal authorised undertakers.

I could quote many small undertakings which adopt every means for the developing of their undertakings—including free services, assisted wiring, hire and hire purchase of all types of apparatus and appliances, an excellent "Service Department," and numerous other methods of improving the goodwill between the undertakings and consumer.

Centralisation is no doubt good, and in some instances it may be the means of reducing the cost of the commodity, but "over-centralisation" can be shown to be detrimental to progress.

It has not been proved that by the centralisation of distribution the price of electricity will be lower. Even if the price could be reduced is it contended that service efficiency would remain as it is to-day? If so, I emphatically deny it. Operations over a wide area never attain the success which is obtained by schemes governed by local influence, and unless personal contact between supplier and consumer is maintained development will be slow. Cheap electricity is not the only means of securing success in development, an efficient service is essential, and it is maintained that the small municipal electrical undertaking is carrying out its duties in this direction and is a most important entity to be considered in any scheme for centralisation.

If it can be proved that by co-ordinating distribution on similar lines to that of generation a cheap supply will be available, then it should be tackled without delay.

If the daily Press is correct, the question of co-ordination is at the present time being considered by the powers that be, and if it is proved that by such co-ordination a cheaper supply of electricity will be made available, then the supply authorities will no doubt assist in any suggested scheme.

Brig.-Gen. Legge suggests the formation of a Sales Development Association, but this will not serve any useful purpose until the price of electricity is more uniform, or perhaps I should say, until prices are fixed by a common formula. All the propaganda in the world will not attract potential consumers, if the price is too high. Further, what about E.D.A.?—surely this organisation is fully capable of undertaking all the propaganda work necessary to secure the development of electricity. I believe Brig.-Gen. Legge is a member of the E.D.A. Council—is he suggesting that it should be abolished? A reduction in the number of organisations is required—not an increase.

It is fully agreed that now that the Central Electricity Board has practically completed what it set out to do the supply authorities must pull their weight if success is to be attained. I think it can be said that supply authorities are pulling their weight, although it must be remembered they are somewhat handicapped owing to the high assessments of their undertakings. This is, I agree, a very debatable point, but, nevertheless, an important one, and one which undoubtedly obstructs the development of electricity undertakings.

Any scheme for the centralisation of distribution will not mature for some considerable time, meanwhile the publicity organisation of the industry should put forward every endeavour to educate potential consumers in the many advantages in the uses of electricity.

Municipalities and companies differ somewhat in their management, but they both work under the same Acts of Parliament and should have the same object in view—cheap and efficient service.

Municipalities should, however, consider that vexed question of placing their surplus profits to the Reserve Fund, for the development of the undertaking and reducing prices, instead of subsidising the rates.

The absorption of small municipal electrical undertakings is becoming quite a common topic amongst company people and there is an impression that the centralisation of distribution is going to be the means of cheaper electricity, but no concrete facts have yet been produced to prove this theory.

The municipal supply authorities are doing their best in forwarding the development of electricity—why propound new theories if no greater success can be attained?

Reinforced Concrete Poles. By Baird Dennison

Their advantages as compared with other types

A BRITISH electrical engineer travelling on the Continent cannot fail to observe the very extensive use made of concrete transmission poles for secondary and tertiary circuits. He may recall a rather sweeping statement in the Central Electricity Board's Annual Report for 1930:—

"The standard types of lattice steel towers have been used on all lines built during the year. The advantages in certain respects of reinforced concrete and wood as alternatives to steel have not been overlooked. So far there has been no justification for adopting either of these alternatives, but the situation will be reviewed from time to time so that advantage may be taken of any technical improvements which may arise."

With direct evidence of the suitability, practical economy, and simplicity of form of concrete before his eyes he may feel inclined to challenge the assertion that there has been no "justification" for adopting it at home.

The table below sets forth the average capital and maintenance costs of wood, steel, and reinforced concrete masts in this country per mile of transmission line:—

Materials Used	*Original Cost*	*Annual Maintenance Costs*
Wood	£208 0 0	£27 4 0
Steel	£275 12 0	£22 10 0
Reinforced concrete	£218 16 0	£13 0 0

Concrete costs very little more in initial outlay than timber and less than half in maintenance, and considerably less than steel in both respects. The saving in maintenance in some cases has been equivalent to a reduction of £1 9s. per kV in the net cost of distribution. The compressive strength of reinforced concrete for masts can be taken at 2,600 lb. per sq. in., which gives a safety factor of 2,600/750=3.5, though it may be much nearer 4.5. It is desirable to allow a somewhat greater margin of safety with concrete than with fabricated steel because its strength is apt to be more variable. As concrete is not subject to decay or erosion, the poles do not need to be creosoted or periodically painted; nor do their bases require to be waterproofed or preserved against destructive insects.

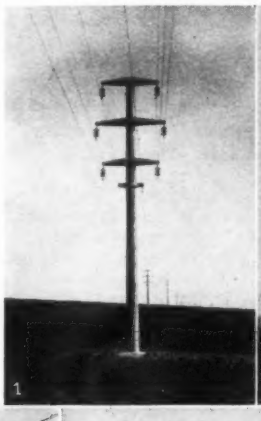
A concrete mast, whether of solid or hollow section, is a self-contained monolith, made at a single casting, which can be readily moulded to any length, thickness, and shape. Hollow-cored concrete masts are now almost invariably centrifugally moulded; the Italian Vianini process, which has been adopted by the Duisburger Cementwarenfabrik—the largest firm of precast manufacturers in Germany, if not in the world—is perhaps the most widely employed. Centrifugal casting is always used for the lofty masts designed to carry the very highest voltages, though it is equally appropriate for the lightest type of feeder pole. Hollow concrete masts for primary circuits were first introduced by the Royal Swedish Waterfalls Board, the model adopted being of the gantry, or "goal-posts," type with twin poles united by an overlapping cross-bar from which the insulators are suspended. At present these three-element gantries carry a voltage of 130 kV, which is ultimately to be increased to 220 kV. They were designed by Dyckerhoff and Widmann A.G., of Wiesbaden-Biebrich, and manufactured by the Contractor Company of Stockholm.

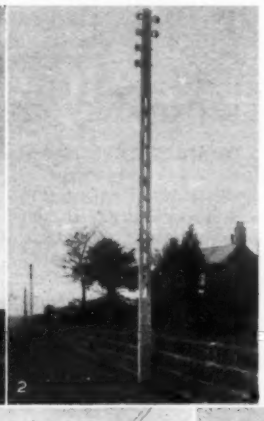
Heavy Foundations Dispensed With

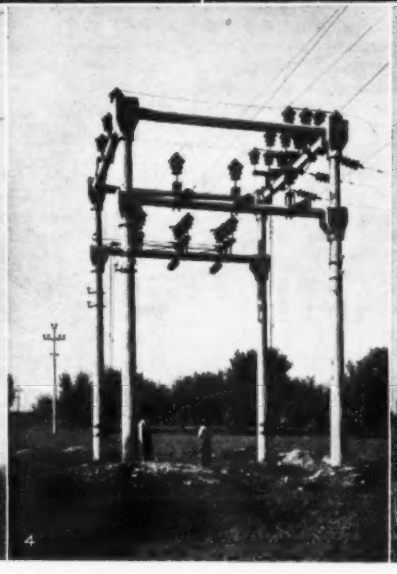
The same type of cross-bar suspension was recently adopted by the Società Idroelettrica Piemonte for the intensely cultivated plain section of its 220-kV Cardano-Cislago primary circuit in Northern Italy, in preference to lattice-steel pylons. Steel pylons require 6 to 7 cubic metres of mass-concrete foundations, and owing to their widely splayed bases the company would have been obliged to pay heavy compensation to the landowners of the rich agricultural region traversed, because it is virtually impossible to sow and reap underneath them. By substituting reinforced concrete for fabricated steel this difficulty was entirely overcome. These cross-barred double masts were made by the Società Cementi Armati Centrifugati, of Trento, and are spaced 260 metres apart. They weigh six tons apiece, and are 19 metres in height (two metres of which is embedded in the ground), tapering from 57 cm. diameter at the base to 33 cm. at the summit. The voltage is 88 kV higher than that of the British grid.

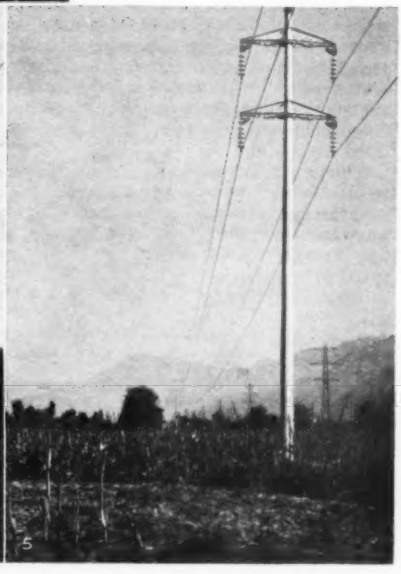
Design differs very considerably country by country, and even area by area. Where single poles are employed, brackets of precast concrete, mild steel, or forged iron can be used of either the alternating "step" pattern, Y-fork, or ordinary yard-arm types, according to local requirements and the number of cables that have to be provided for. Transport and erection are considerably simpler than with lattice-steel towers, and beyond the attachment of brackets or eyes no *in situ* "finishing" of any kind is required.

Solid-moulded concrete masts are mostly of oblong cross-section, "openwork" type, in which the slots take the form









A Few Examples of Concrete Poles

1. A double-circuit intermediate pole in the Brighton-Worthing 33-kV grid line (400-ft. spans). 2. A slotted pole in the Chester rural area. 3. A single pole supporting a 120-kV line near Venice. 4. A 40-kV disconnecting switch in Northern Italy. 5. An Italian single-mast, four-conductor, 60-kV line

of a series of rectangles or circles, fretted out of the broader faces of the shafts, diminishing in size from the base upwards. One particularly good "openwork" design, common in France, has a pattern of acute-angled triangles, with apexes and bases resting on alternate sides of the pole, in which the dividing struts zigzag themselves into a sequence of capital "Ms" and "Ws." Masts of this type, when seen silhouetted along the bare crest of a hill or against a glowing sunset, are as nearly invisible as a line of poles can be. The use of a buff tinted cement, which has been adopted by several French distributing companies, instead of the ordinary grey, still further increases their inconspicuousness.

An English Example

A light type of mast, which represents a compromise between the design just mentioned and the plain rectangularly slotted "self-climbing" model, has been used in the Chester rural district. These are 36 ft. in height, weigh 15 cwt., and cost only about £4 15s. apiece (without brackets) delivered on site. The total cost per mile of the 6.6-kV Barton-Filstone line in that area worked out at only £328 9s. or, for all practical purposes, no more than had timber poles been specified, because fewer concrete masts are required, and also because they do not need stay-wiring. An ordinary short derrick fitted with a hand-winding winch sufficed for their erection. The masts were cast locally in portable moulds by Ferro-Concrete & Electrical Construction, Ltd., of London; "Ferrocrete," the rapid-hardening Portland cement and special high-tensile reinforcement were employed. Their flexibility under high wind-strains can be judged by the acceptance tests to which they were submitted. When clamped in a horizontal position and loaded at the peak with the equivalent of their own weight, deflections up to 15 in. did not threaten any break. Minute hair-thick fissures naturally appeared during the bending stress, but these disappeared immediately the weight was removed.

People who write to the papers to protest against the "vandalistic disfigurement" of English scenery by the erection of transmission lines might ask themselves what has been the experience of countries which were till quite lately considerably ahead of us in electrical development. France, Germany, Switzerland, Italy, Austria, and Sweden cannot afford to jeopardise the commercial value of their scenic beauties, historic sites, and artistic prestige. Yet they have never known agitations such as we are only too familiar with, for the excellent and sufficient reason that their citizens were quick to realise that a high-voltage transmission line of concrete masts is far less injurious to the beauty of the famous landscape than a creosoted palisade of telegraph poles, whose presence along English country roads has, oddly enough, never occasioned any sort of outcry from Nature-lovers, champions of "rural amenities" or romantic-minded opponents of progress.

In this connection the following extract from a correspondent's letter to *The Times* is not without interest:—

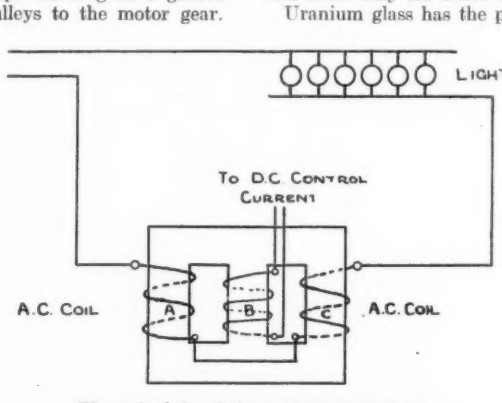
"Lattice girder construction of Eiffel Tower design is, as a rule, an eyesore. The inverted U is better; but for some reason reinforced-concrete standards of open design seem to offend the eye least. The general design of the reinforced-concrete standards of the Chemin de Fer du Midi, and of the authorities supplying electric light and power in the Pyrenean valleys, would well bear close study."

Probably if the objectors were shown, as examples of what could be done, some of the reinforced-concrete masts illustrated in this article in their actual surroundings (which in many cases are of great mountainous magnificence, and in others of an intimate, well-wooded, rural beauty not unlike typical parts of rural England) their opposition could be overcome.

Electricity in the Theatre

By F. G. H. MACRAE (Chief Engineer, Theatre Royal, Drury Lane)

IN the mechanics involved in the presentation of a play, this age has added little to the devices of antiquity. In the early Greek theatre (430 B.C.) cranes and suspension machines were used to lower the actors who represented divinities, and many references are made to a machine on rollers similar to our modern scenery truck. The latest engineering device to achieve popularity is the revolving stage, which originated in Japan in the seventeenth century. The chief difference is that these devices are now worked by electric or hydraulic power. In its present form the revolving stage may be either permanent or portable; a 3-h.p. motor is sufficient to drive a stage 40 ft. in diameter. The stage is constructed of steel diagonals with ball-bearing wheels at the periphery running on a polished-steel track. Rotation is accomplished by means of a wire rope working in a groove around the edge and over jockey pulleys to the motor gear. A solenoid brake is fitted at one end of the motor-shaft, the whole being operated through a tramway-type controller, this having been found to be the most suitable for the purpose. The table top is constructed of either teak or oak, and on the centre pin is a commutator, which supplies current to plugs fixed under the flooring and used for lighting.



The principle of the reactance dimmer

The stage lighting load has notably increased; a recent production called for 2,000-A, occasioned by the use of 1,000- and 2,000-W lamps in focusing lanterns. The more frequent use of colour media is to a large extent responsible for this, and the arc lamp, except in one or two special cases, is gradually being superseded by the high-power gas-filled lamp, which may be operated and dimmed from the centralised main switchboard.

The more general use of a.c. will enable the reactance principle of dimming to be employed, as it allows a single dimmer to control 30 kW as against 3 kW by the wire resistance method on d.c. The reactance dimmer consists of three coils wound on an iron core. The two outer coils are in series with the load; the middle coil is in series with the d.c. control circuit, which is regulated by a small wire resistance at the switchboard. With no current flowing through the middle coil, the current in the lamp circuit in the outer coils is opposed by the impedance set up by the self-induced voltage, and the lamps are out. When d.c. is admitted to the middle coil the magnetic flux in the iron core reduces the impedance, and the lamps brighten.

At least one important theatre has its own clinic, where members of the company and staff may receive the benefit of artificial sunlight treatment, but ultra-violet rays have also been used in many recent productions in conjunction with chemicals which exhibit the property of fluorescence, the scenery and costumes being treated to create the desired effect. The rays are projected on to the scene by means of arc lamps fitted with special glass filters which cut off all visible light and allow only the short waves to pass.

Uranium glass has the property of fluorescence in a marked degree, and has been used for decorative purposes in a darkened auditorium, beautiful and remarkable effects having been produced by this means.

The ordinary electric lamp has also been effective to the same end, despite its deficiency in blue rays, and the results are such as to promise that fluorescence will form an important feature in future display.

The tendency is to centralise the control of the various stage illumination units at the main switchboard, thus avoiding a number of operators, and to use remote-control switches where the load is heavy. Signals to various points consist of two lamps wired in series operated from the prompt corner. When an electric motor is out of sight, a pilot lamp in the armature circuit fixed near the starter shows when the machine is running. Pre-set switchboards are also a feature of theatre design, so that the lighting for the next scene may be set whilst one is already under illumination.

Switchboards are invariably required to be "dead front" to eliminate the possibility of shock, and all enclosed switches must have the "on" and "off" position clearly indicated.

Industrial Developments at the Fair

MOST of the trade groups represented at the Fair have increased in size this year. At Castle Bromwich 1,042 exhibitors occupy 244,374 sq. ft. of space. In London 1,168 occupy 270,524 sq. ft. at Olympia, and 365 occupy 194,779 sq. ft. at the White City.

The Electrical Section is unquestionably one of the most attractive and interesting spots this year. Several exhibitors have displays in both Birmingham and London; a number have considerably larger stands than last year; others are showing for the first time, but a few manufacturers who were not able to obtain what they considered to be adequate accommodation have refrained from exhibiting. One still hears the criticism that the Electrical Section at Castle Bromwich ought to be more prominently situated.

The demand for space reached record proportions this year. In one case the space formerly occupied by a single firm is being shared by nineteen; roofed outdoor stands have been erected.

The Diesel-electric rail coach which is being demonstrated between Euston and Birmingham for the period of the Fair was built as a whole by Sir W. G. Armstrong Whitworth & Co., Ltd., and is similar to the 1,700-h.p. coach described on page 777 of our November 25th, 1932, issue, which has a Sulzer engine, Brown Boveri generators, and English Electric motors and control gear.

B.T.-H. public address sound amplifying equipment is installed in the Royal, Bradford, and conference rooms. "Creda-Vulcan" tubular heaters of the Simplex Electric Co., Ltd., are in use in the main dining hall, public rooms, and other parts of the Fair buildings. "Revo," G.E.C., and Berry's heating and lighting equipment is similarly employed, while some of the buildings are floodlighted (G.E.C.). In the kitchen serving the large dining room there are installed electric cooking and heating appliances of "Tricity," G.E.C., Reyrolle, and Jackson makes. Gent electric clocks are in use.

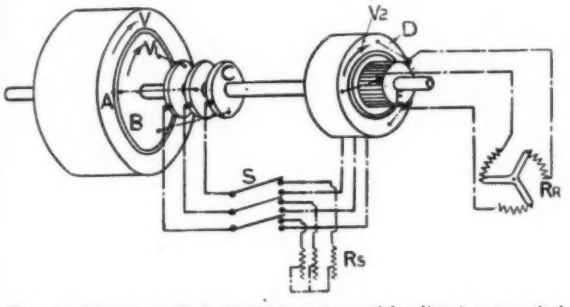


Fig. 1.—Diagram of induction motor with direct connected Heyland exciter

A, stator of induction motor; B, rotor of induction motor; C, slip rings of induction motor; D, stator of exciter; E, rotor of exciter; V, synchronous-speed of motor; V1, shaft speed of motor; V2, synchronous speed of the stator field in the exciter; S, switch to connect starting rheostat or exciter; Rs, starting rheostat; RR, regulating rheostat.

Woodworking Machines

The Dominion Machinery Co.'s woodworking machines of varied types are all electrically driven, with M.E.M. controllers and Brook motors, built-in or belt driving. The Midland Saw and Tool Co.'s display of joiners' plant includes examples of driving by Brook & Lancashire motors.

Electrically actuated vibrating screens are shown by Pegson, Ltd., and Thos. Locker & Co., the latter exhibit including a vibrating pan feeder also. The Stephens Belting Co. is demonstrating the speed and labour-saving possibilities of sewing machines for heavy leather, driven and controlled electrically (B.K.B. motors). Vlastro, Clark & Watson are featuring control gear, such as flameproof air-break types for mines, auto-starters and controllers for laundries, crane switches and protective appliances.

On the stand of R. A. Lister & Co., Ltd., is some dairy machinery which includes an electric milk and cream separator.

Furnace Control

Furnaces of different types with associated control gear are conspicuous. Apart from the "all-electric" makes already noticed, there are a number with which are incorporated electric fans, controls, and pyrometry outfits, including Siemens, Foster, Electroflo, Morgan Crucible Co., Baird & Tatlock, and the Incandescent Heat Co., both in the oil and gas heating sections of the show.

Then there are at least seven different makes of central heating and domestic oil burners which depend entirely upon electricity for the automatic control of their fans, temperature, flame, and ignition, among the firms concerned being Parker Winder, & Achurch, Laidlaw Drew & Co., Homatra, Ltd., Urquhart's (1926) Ltd., G. E. Pellinger & Co., Hope's Heating and Lighting, Ltd. ("Electromatic"), and Combustions, Ltd.

The Birmingham Corporation's Stand

On the stand of the Birmingham Corporation varied industrial applications of electricity are being demonstrated, such as Verity motor drives, Vidal portable drills and other tools,

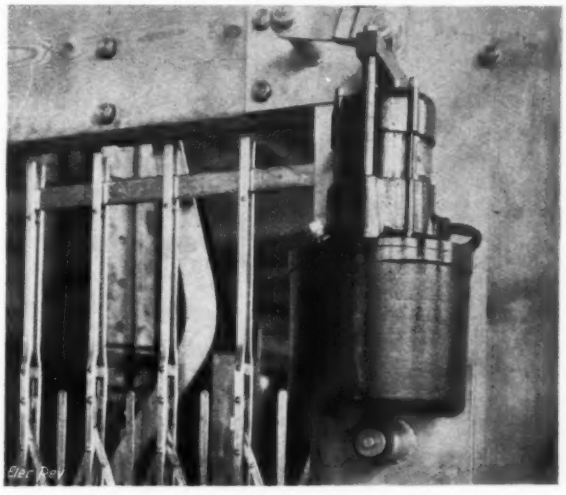


Fig. 2.—The B.T.-H. "Thrustor"

B.T.-H. small motor armature winding, bottle cleaning equipment made by the Thos. Hill Engineering Co. (Hull), Ltd., a "Linotype" machine equipped with a three-way quadder, magnetic chucks and separators by the Rapid Magnetting Machine Co., a "Magnet" (G.E.C.) aluminium die-casting furnace, "British Electric" welding machines, a Jackson restaurant water boiler, Tucker switches, and "M.E.M." switch and fuse gear.

Turton Bros. & Matthews, Ltd., have a fine display of magnet steels and permanent magnets of the "Torpedo" tungsten and cobalt varieties in many shapes and sizes for radio loud-speakers, telephones, magnetos, railway signals, and electrical instruments.

S. Russell & Sons, Ltd., make metal cold sawing machines driven by a motor mounted on the cover plate of the saw carriage and coupled direct to the shaft. The "Hydrofeed" has four speeds, all gearing enclosed, with fast moving shafts in ball bearings. The main motor is of 10 h.p., while a separate 2-h.p. motor drives an oil pump, variation of the stroke of which controls the feed of the saw carriage. The two motors are interlocked electrically so that the pump cannot be started without the saw.

A sample of the strip bright annealing furnace which the G.E.C. is placing on the market is on view. This company is also making electrode boilers, steam generators, and hot-water circulators of the high- and low-voltage types in sizes from 50 to 10,000 kW.

A New Vehicle Traffic Indicator

The "Silvertown" Company's new traffic signaller for motor-cars combines moving yellow lights with direction indicators at the front and rear of the vehicle. The instrument

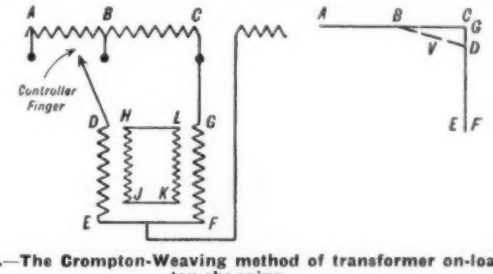
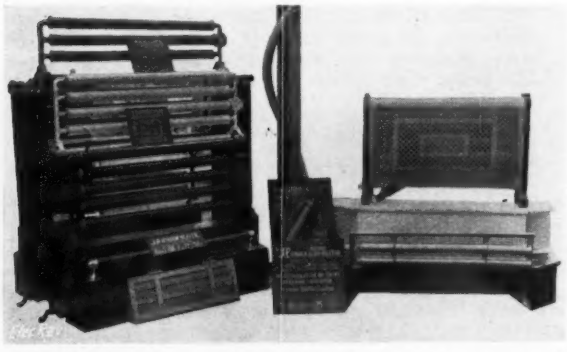


Fig. 3.—The Crompton-Weaving method of transformer on-load tap-changing

will enable the driver to indicate his intended change of driving direction, both to vehicles behind and to traffic officers ahead. A slender shaft of light flashes across a panel, and finally comes to rest in the shape of an arrow, pointing in the direction intended. After two or three seconds it disappears, the operations being automatically repeated as long as is necessary.

The signals are controlled by a neat switch on the dash. The motive power is derived from a small electric motor, and the current consumption is well within the scope of the ordinary car battery.

Chance Brothers, Ltd., have a street traffic controller, which



Multi-tube radiators, a 3-kW protected unit and an enclosed heater; J.P. Tubular Heater Co. **(See page 270)**

is termed the "Omniflo," since the coloured signal lamps are actuated by the vehicles passing over roadway surface ramps.

A New Power Factor Corrector

The three-phase "H.M.S." exciter for correcting the power factor of induction motors built by Laurence, Scott & Electromotors, Ltd., is constructed according to a new patent of Dr. A. Heyland. This a.c. phase advancer is self-exciting and is connected to the slip rings of the motor to be compensated, adapting itself automatically to the operation of the motor so as to obtain any desired p.f. correction, which remains practically constant independently of variations of load, even sudden ones, and with good commutation at all loads.

Fig. 1 illustrates the principle. This exciter can be fitted to any existing slip-ring motor over 50 b.h.p. and built in, or driven by belt or a separate small a.c. motor, needing only a small three-pole change-over switch. Installation is easy and the space occupied is very small. The frequency in the exciter field is the same as the frequency of the current under the brushes, although the frequency in the armature is different and governed solely by the absolute speed of the armature, the commutator being intrinsically a frequency-changing organ. The armature rotates in the same direction as the field, and the frequencies in the three constituent parts of the rotor circuit equal the stator frequency.

The exciter armature, by its rotation at an absolute speed with reference to the field, generates at a certain frequency an e.m.f., which, by the function of the commutator and brushes, is transformed into another e.m.f. at a different frequency. According to the design and proportions of the machine this e.m.f. can be made of sufficient strength to create a current which, in phase, will be precisely that necessary to magnetise the rotor of the induction motor. Thus the motor receives its magnetising current component from the exciter, and, furthermore, this e.m.f. can be so proportioned as to compensate for the wattless component due to the leakage flux of the stator and rotor winding.

The invention of Dr. Heyland resides in the method of winding the stator of the exciter. The winding, which is extremely simple and similar to the stator winding of standard induction motors, has the peculiarity that it forms stationary commutating fields, enabling perfect commutation to be achieved in spite of the fact that the brushes are in a fixed position relatively to the rotating field. The phase of the rotor current is shifted under the influence of the exciter. The current in the rotor increases, but this is compensated by a decrease of the stator current, so that the exciter as a rule does not affect adversely the efficiency.

New Tap-changing Gear

The Weaving transformer on-load tap-changing gear produced by Crompton-Parkinson, Ltd., employs a patented system of compensating transformers which take the place of the ordinary mid-point balancers. The method attacks the problem from a new angle, because it minimises the arcing tendency by reducing the break voltage, and thus the severity of the duty to within the capacity of ordinary selector switches without mechanical complications. In this method (see fig. 3) the tapped part of the transformer winding is marked ABC, while DEFG indicate primary windings of the compensating transformer and JHKL, a secondary winding mounted on the same core. The windings JH and KL are connected so that they oppose each other, and therefore carry a circulating current only when their respective primaries DE and FG are in parallel and are connected to the taps BC, as shown, but no current if both primaries are connected to a single tap. When the circuit B-D is broken the primary current DB begins to fall, and consequently the voltage in HJ also falls. As the load current in G-F is still flowing, the voltage in L-K still operates, and owing to the reversed secondary connections it sends a reverse current through HJ, thus tending to induce an e.m.f. in DE equal and opposite to the e.m.f. previously produced by the load current, and in consequence the resulting voltage across the break is very little higher than the tap voltage B-C.

Glass Fabric

Over 600 "Mazda" lamps, taking 25 kW, illuminate the stand of the British Thomson-Houston Co., Ltd. Eight pillars in the structure consist of wooden frameworks over which is stretched a new diffusing material, a "glass impregnated" fabric, covered with minute fragments of glass, which is delicately tinted when lighted internally.

The electro-magnetic "Thrustor" (fig. 2), which can be operated in conjunction with a photo-electric cell, has numerous applications when a steady pressure is needed through a given stroke. For opening and closing an expanding gate or door, for instance, and actuating lever mechanisms.

For loading coal and other dry materials from heaps into wagons and on to conveyors, time and labour can be saved and hand shovelling eliminated by using the "Joy Loader" of Mavor & Coulson, Ltd. The gathering head is pushed into the pile where two arms sweep the material on to the loader, which consists of front and rear belt conveyors that can be raised and lowered and moved sideways as required.

Supplementary Exhibits

The following particulars arrived too late for inclusion in last week's issue:—

W. T. French & Son show a new rapid-boiling aluminium hot plate with an alloy top and an 850-W "Chromalox" heating element, particularly suitable for use with "Mysto" aluminium utensils, which have 0.25-in. thick bottoms machined dead flat; also irons, 1- and 2-kW fires, kettles, toasters, coffee percolators, and domestic hardware. Electrolux, Ltd., show refrigerators and vacuum cleaners with new attachments and Lectro-Linx, Ltd., self-adjusting "Clix" plugs of unorthodox design for 5-A circuits.

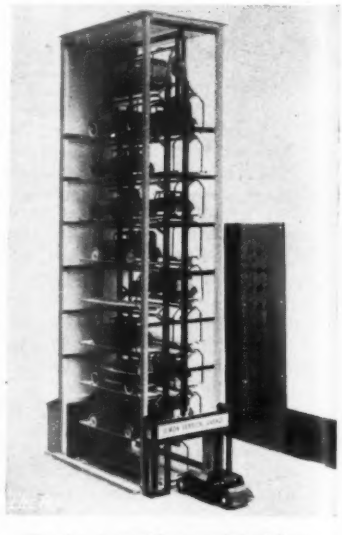


Fig. 4.—A working model of the "Simon" vertical garage

The D. P. Battery Co., Ltd., displays "Kathanode" cells and "Keepalite" emergency lighting equipments. The Electro-Dynamic Construction Co., Ltd., has on view condensers and phase advancers for power factor correction; small extra-light-weight d.c. motors and generators; motor-generators for high-frequency neon signs, X-ray, and wireless purposes. Pritchett & Gold and E.P.S. Co., Ltd., put forward accumulators and "Dagenite" boxes, which composition will not crack easily and is not affected by temperature variation.

The Telegraph Construction & Maintenance Co., Ltd., exhibits insulating materials—gutta percha, "K-gutta" for telegraph cables, "Telconite" for instrument connections, "Telconax" for trailing cables; induction melted alloys; special metals for resistance furnaces, cable loading, radio transformers, and high-frequency circuits. The exhibit of Silvertown Lubricants, Ltd., comprises oils, greases, and compounds; insulating transformer and switchgear oils and compounds; and machine-tool cutting lubricants. Serck Radiators, Ltd., products include heaters, heat exchangers, coolers, and air blast equipment for transformers, alternators, &c.

G. M. Gledhill & Sons, Ltd., recently completed works extensions to meet the demand for cash registers, adding and printing machines; they show Gledhill-Brook time recorders, costing, and wage paying systems. The United Steel Companies, Ltd., have a varied display of products of branch and associated concerns.

Domestic Cooking and Heating

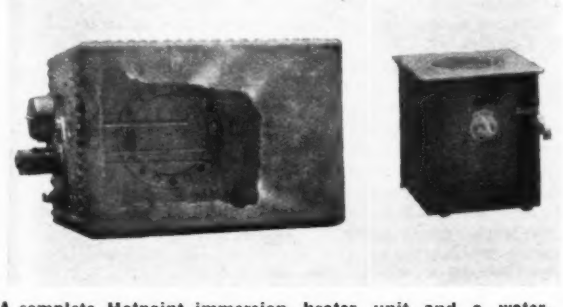
Impressions of a visit to Castle Bromwich

AT the Birmingham Section of the British Industries Fair this year there are more new cookers, fewer designs all told, and fewer changes in principle. That spells stabilisation. But there is much new to be seen in the way of constructional features. The latest move in standardisation—fewer models and retaining the makers' individuality—has caught on.

The General Electric Co., Ltd., says it has been definitely encouraged in the two-cooker movement; the long-awaited Hotpoint-B.T.-H. range is in two sizes only; the Falkirk Iron Co., Ltd., is putting forward only three models; Carron Company's domestic range is now limited to three; another newcomer, the English Electric Co., Ltd., also has only three; the new No. 30 cooker of the Revo Electric Co., Ltd., is the first of a new range of three; "Tricity" cookers exhibited and now sold by L. G. Hawkins & Co., Ltd., appear in only three sizes; and there are only three models in the range of British National Electrics, Ltd.

The Hotpoint-B.T.-H. "De Luxe" design is a packet of many surprises. Some of them are "Torribar" ("Calrod") 2-kW interchangeable boiling-plate elements on stainless-steel supports, within heavy aluminium surrounds and over aluminium dish-shaped reflectors; non-plug-in boiling units, with the terminals right away from the plates; a vitreous-enamelled removable grill chamber interior; side and bottom "Torribar" elements in the oven with heat baffles over the side units; the heat insulation for the door and sides is "cast" in slabs with firm exterior surfaces and soft interiors, so that there can be no wool dropping; one of the back legs is adjustable in height; the back vent has a tie piece outside and is bushed right into the oven interior.

Two "Utility" models are the same size as the smaller "De Luxe," but one has two boiling plates and the other only one, each in addition to the boiler-griller. The one-plate model has a reflector plate, without turned edges, for use under the boiler-griller. The sides and bottom of the hot-cupboard interior are in one piece. The closed solid plates have three-point adjustment with centre locking. Six 350-W interchangeable fireclay bar elements are outside the removable oven.



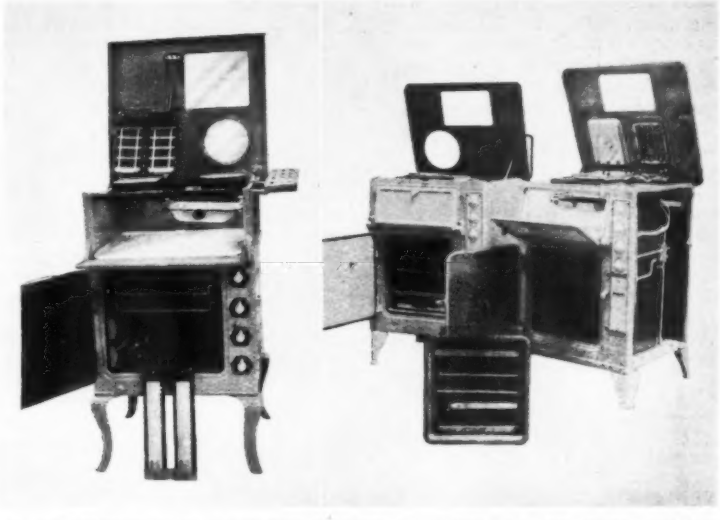
A complete Hotpoint immersion heater unit and a water-jacketed boiling plate (Berkeley & Young)

Boiling Plates

There are some "visible heat" plates, including both the red-hot sheath and cover types, and low-voltage open-coil plates. Many cookers are fitted with "Chromalox" units, some as alternatives, and perhaps the most noticeable change-over is that of the Falkirk Iron Co., Ltd., whose representative complained of the tendency for the closed plate to hump in the centre. One of the three cookers referred to is an improved old "Hotpoint Falco" model, while the two new ones include one with two boiling plates and a grill-boiler. Inside the fixed oven interior "slab" metal-enclosed plug-in elements are fitted. The other cooker is similar in design, but with a 2,000-W boiler-griller and a one-heat 650-W plate. An unusual feature is a fixed aluminium crown plate, slightly sloped towards the front.

The Revo Co. reports a good year for the flat element "Superspeed" which can be fitted in the new "No. 30" model, outstanding features of which include a switch case in the cooker structure, a hot-cupboard which takes up the whole of the width, and the last word, one would imagine, in the movement towards the simplicity of hot-plate supports. When the three hob units are taken out there is just one simple bar back to front. There is another member of the economy range, "No. 0," for three or four persons, making seven models in this range in all.

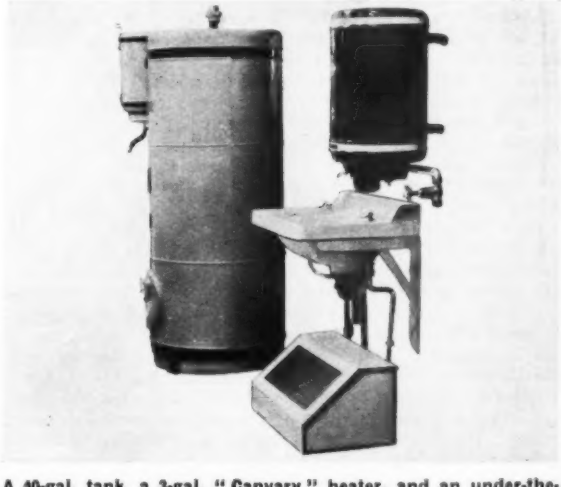
British National Electrics, Ltd., are proud of the fact that their plug-in elements are absolutely inaccessible from the



A new Jackson cooker and the Hotpoint "Utility" and "De Luxe" models

fixed-oven interior. The plug-in elements in the new No. 94J of the Jackson Electric Stove Co., Ltd., have considerable air space between the element proper and the sheath, which has vents, so that the sheath runs at a comparatively low temperature, allowing foodstuffs to be placed very close to it. A sloping air vent in the door is cleverly concealed. The hob units are all plugged in at the back away from the heat. A new boiler-griller has a spacing in the middle between the two element banks to avoid hot-spot effect. The English Electric Co., Ltd., goes so far as to enamel the casting, including the heat-presentation area. Belling & Co. also enamel their semi-open boiler-griller now, but for a different reason. The resulting insulation of the casting and consequent protection for bulged spirals has definitely increased the life of the plate. The two larger "Tricity" cookers have separate grills, with the crown plate between the boiling plates and the grill which opens out into the grilling chamber. We were impressed by the quick-release terminals employed.

There is a very marked resemblance, from a distance, between the two new Belling cookers and Carron Company's new model; there are no projections at the front. This is simply a further development of the move towards the elimination of corners, said Mr. Fraser (Carron Co.). The cast-iron front on the removable oven interior of this company's cooker, to give a good fit, appealed to us, as did the lift-out hob unit spider and the definite hob and oven earthing connections.

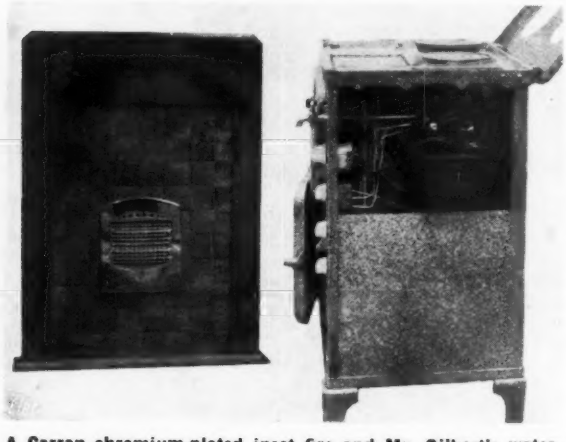


A 40-gal. tank, a 3-gal. "Canvary" heater, and an under-the-basin model (Berry's Electric, Ltd.)

The success of the C 293 Creda (Simplex Electric Co., Ltd.) has led to two larger models on similar lines, and a smaller one with one boiling plate and a grill in the 12 in. by 12 in. by 10 in. high oven. Another small model of this make has a grill outside the oven.

Mr. Gilbert, of Berkeley & Young, Ltd., showed us a novelty in boiling plates. The scheme embodies a heavy resistor low-voltage open element carried on special heat-resisting steel pressings floating in a spirally grooved refractory mounted in a casting incorporating a water jacket. Heavy copper-rod connections to the spirals are taken through the water tank below the porcelain; thus all "waste" heat is absorbed by the water. The jacket holds about ¾ gal., and an appreciable amount of reasonably hot water is available after only 10 minutes or so run. The element is loaded at 2 kW (three-heat). We saw such a plate fitted to an ordinary cooker with the transformer on the side, giving a projection of about 4 in. There is also a self-contained unit with the transformer incorporated in the frame below the plate.

We can hardly imagine Mr. Vale, of the General Electric Co., agreeing that "hump" trouble occurs on enclosed boiling plates. He showed us some test curves depicting variations in plate surface temperatures when operating with different kinds of utensils. With a cheap type of kettle with a recessed bottom, the casting temperature at the centre was 680 deg. C.; and at 1¼ in. from the centre 720 deg. C. With an enamelled utensil the corresponding temperatures were 480 deg. C. and 515 deg. C., and with a "Pyramid" utensil they were 265 deg. C. and 275 deg. C. The smaller of the two standardised "Magnet" cookers is shown with a special "armour plate" Pilkington glass panel in the door.



A Carron chromium-plated inset fire and Mr. Gilbert's water-jacketed boiling plate in an ordinary cooker

The company is getting optimistic about the thermal storage cooker; sixty models have been installed by one undertaking alone. A new overseas cooker is smaller and has only two boiling plates. Among numerous new breakfast cookers and self-contained boiling plates, &c., we saw a double-plate Bray unit, an elliptical Revo table boiler, Belling models with remote-control switches, and a larger edition of Berkeley & Young's "Nippy."

Space-heating Equipment

It is to be hoped that the enormous increase in the numbers of electric fires on the market is indicative of the progressive capture of the heating load. There is obviously a demand for all sorts, shapes, sizes and prices of electric radiators. They are to be seen in the most unexpected places in all sections of the Fair. The smallest fire in the show, we think, is on the stand of J. J. Siddons, Ltd., but others shown by Electric Radiators, Ltd., Suffolk Iron Foundry (1920), Ltd., Girlings, Ltd., and others, run it a close second.

A novelty is a triangular-shaped fire shown by H. Frost & Co., Ltd. Thomas Winston has a screen reflector fire with a vertical rod element deeply recessed. Williams (Birmingham), Ltd., are showing bowl fires with circularly corrugated reflectors, and so are the Midland Metal Spinning Co., Ltd., and Ryland Works, Ltd. The Wharf Lane Concrete Co., Ltd., shows reflector inset fires with rod-type elements.

Perhaps the largest (dimensional) strictly portable fire at Castle Bromwich is a 3-kW "Creda" seen on the Birmingham Corporation stand. It looks good, and has a very heavy single rod-type element nested under the cover for downward protection and above imitation fuel, all in a massive polished frame. Bratt Colbran, Ltd., have an excellent show of reflector fires, including one with two separate elements on each rod, wound so that when only part heat is on the heat is distributed over the whole area. The G.E.C. has a chromium-plated inset fire with the back closed in by a steel box, so as to keep the heat in. A similar thing shown by Carron Company has single-screw fixing from the front into the built-in box. British National Electrics, Ltd., have a panel reflector fire separate from a recessed grate for imitation fuel, all mounted in a synthetic-stone surround. A panel fire with imitation fuel, a log basket fire with self-contained elements, and a dog grate fire in rustless bright designed for Unilever House are only a few of the new "Magicoal" attractions. The latest form of imitation fuel employs cast-metal. Revo & Belling have introductions of this character. A new Belling log fire has a sort of twig fuel.

W. T. French & Son have an imitation-fuel fire with a front projecting grate below. What appeared to be wood backgrounds for projecting panel-type plated fires on the stand of H. G. Moseley & Co., Ltd., proved to be grained slate. The new Ferranti fires without end reflector pieces have been very successful.

It was good to hear in many quarters that tubular heating was going strong, but exhibits of this class were not plentiful. J. P. Tubular Heater Co., Ltd., told us of a slum-clearance scheme with 1,000 houses so equipped. Concealed heaters arranged on lift-up doors for easy cleaning, protected radiators in ornamental covers, and flexible units for bay windows, &c., are among the latest developments of this company. An experimental convector shown by Hotpoint has a sheathed element threaded through fins with 36 sq. ft. of radiating surface. The only example of l.t. heating equipment other than tubes and convectors that we saw was panel-type equipment on the stand of F. Braby & Co., Ltd.

Water-heating Equipment

Although electric water heating has made comparatively very little advance, we believe that the equipment generally has already proved as satisfactory in construction as any other kind of major domestic equipment, and we attribute that to the E.D.A. Committee's efforts. Most manufacturers said with some pride that they had introduced water heaters to the E.D.A. specification.

Since the last Fair, the G.E.C. has introduced a 1½-gal. push-through heater and also four (5-, 10-, 12- and 20-gal.) rectangular cistern-type water heaters. The thermostats are fixed or variable, and all heaters are now served by the new embedded element, which is also employed for separate immersion units. Jackson's also report a new range to E.D.A. specification.

We saw a Hotpoint immersion-unit combination incorporating a heater, a thermostat, and a draw-off tap on one fixing plate. Actual fixing is done by lock-nuts on the components themselves. A new "Creda" circulating immersion heater available with 3- and 4-kW loadings has an element which is removable in position, and the outer circulating tube is removable for cleaning.

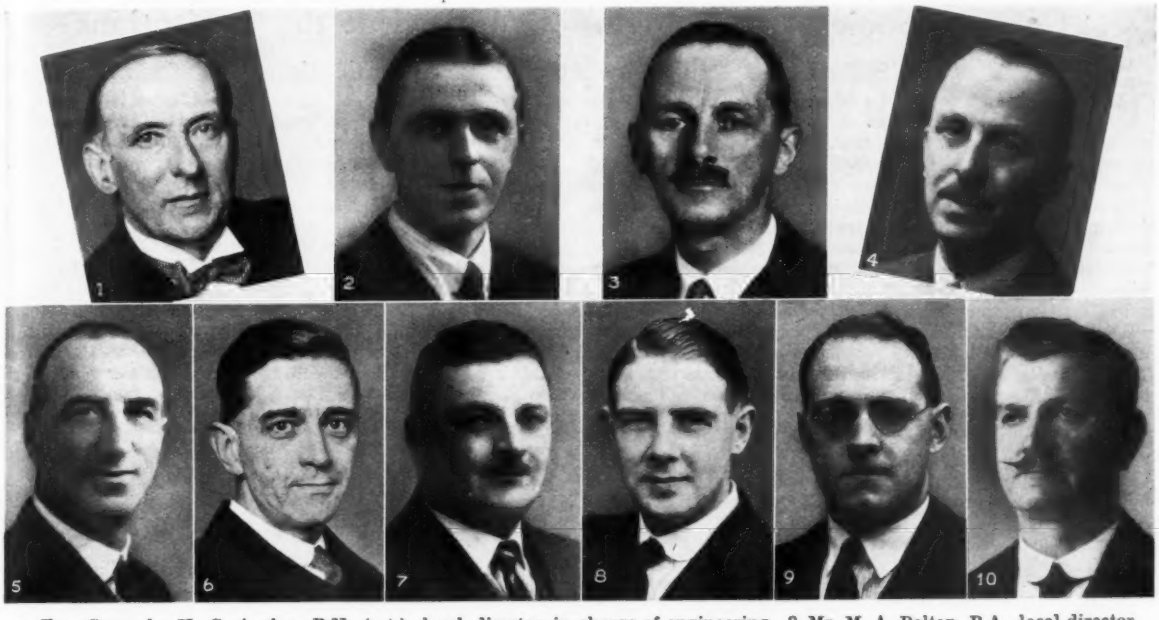
The under-the-basin self-contained water heater, shaped as a foot-rest, seemed to be in its right setting in the "barber's shop" on Berry's stand. We were also impressed by the sound constructional features depicted by a model in section on the stand of A. Reyrolle & Co., Ltd. 3-, 5-, 12- and 20-gal. heaters are suitable for either push-through or pressure. All models have a two-way delivery arrangement in the head—straight down or horizontally. A point about the "Reymez" combined wash-basin and heater (shown by Reyrolle & Adamsez, Ltd., the joint manufacturers) which is perhaps not generally appreciated is that the "hot-water" tap is really the cold-water tap acting as push-through.

Wash Boilers

Wash boilers are becoming more than ever closely allied with water heaters. A new scheme is to employ the boiler for bath-filling and similar purposes. With a cold-water inlet and hot-water outlet both at the top, the apparatus is a push-through water heater, with a suitable flexible lead-off to the bath. The Revo "Duowash" boiler arranged on this principle is a very attractive unit. The "Burco" bath water heater (Burnley Components, Ltd.) is a similar affair, but the surprise item of this stand, and also of the Fair, in wash boilers, is the equipment incorporating a 1-kW fire, separately switched. The recessed fire is protected from water running over the boiler side. The 10-gal. boiler unit is loaded at 3 kW.

The Simplex Electric Co., Ltd., has produced a ten-gal. wash boiler at under £2 10s. One turn of the easy-cleaning tap gives a full-bore opening. A 30-gal. water heater, shown by Moffats, Ltd., has two separate elements, one near the top and one near the bottom, separately thermostatically controlled. We saw exhibited by Eveson Bros. (1928), Ltd., attractive wash boilers in white enamel, including a rectangular model. A portable unit the shape of and not much larger than an ordinary household pail, seen on this stand, is a good scheme.

Some Driving Forces in the Industry: Thomas Bolton & Sons, Ltd.



1. Eng.-Commdr. H. C. Ansley, R.N. (ret.), local director in charge of engineering. 2. Mr. M. A. Bolton, B.A., local director, Staffordshire works. 3. Mr. H. B. Toller, local director in charge of production. 4. Mr. E. J. Bolton, local director in charge of sales. 5. Commdr. W. T. Bird, R.N. (ret.), London sales manager. 6. Mr. W. E. Alkins, M.Sc., head of research department. 7. Mr. G. W. Child, deputy superintendent of Staffordshire works. 8. Mr. H. C. Walters, head office sales department. 9. Mr. G. H. Whiteway, B.Sc. (Eng.), head office sales department. 10. Mr. J. Hayes, superintendent, Staffordshire works

The I.E.E. Dinner

The President again urges the electrification of our railways

THE attendance at the annual dinner of the Institution of Electrical Engineers was bigger than ever this year, close on 700 members and guests being present on February 16th at Grosvenor House, W.

Greetings from the analogous institutions in France and Belgium having been read by the President (Professor E. W. Marchant), the toast of "The Institution of Electrical Engineers" was proposed by Mr. Angus N. Scott (chairman, L.C.C.), who stated that the membership in all grades now exceeded 15,000. He claimed that the L.C.C. was a very large user of electricity, particularly for pumping, which was formerly carried out by steam. In its seventy general hospitals electricity was becoming more and more the handmaid of medical science, and the tramways used 250 million kWh per annum. Mr. Scott commended the floodlighting of the Institution buildings which helped to make a brighter London. He also reminded his audience that the President had had a London career before going to Liverpool University in 1901.

Suburban Railway Electrification

The President, responding, referred to the difference that electricity had made to London since he first came up, thirty-five years ago, to the City and Guilds Engineering College at South Kensington. One of the most striking improvements was due to the electrification of the Underground Railways. No time was so opportune, financially or industrially, as the present was for electrifying our suburban lines, and on Tuesday Mr. Pybus, as Minister of Transport, would table schemes to that end, which would increase employment as well as add to the amenities of life. How much discomfort and delay in travelling might have been avoided had the work been undertaken before! To reduce the number of fatalities on our roads, heavy transport should be transferred to the railways and the chief trunk lines should be converted to electrical operation. The effect on employment might be gauged by an increase in the number of men working on the Underground Railways from 5,500 in 1900 to 14,000 to-day, although the population had grown by only 15 per cent. in that time. Technical development had gone ahead of social organisation; that was not the fault of the engineer.

Professor Marchant also referred to the establishment of the Empire broadcasting station, made feasible by the "whispering gallery in the upper ether," and the completion of the grid this year; he said that he looked forward to the abolition of domestic smoke by the use of electricity for heating.

"Our Guests" was proposed by Mr. J. M. Kennedy (vice-president, I.E.E.), who mentioned the success obtained by Mr. Pybus in the passage of the Transport Bill. He said that the electrical industry was only just beginning to recognise that it paid a quite inadequate amount for publicity. The nearer we approached saturation in the use of electricity the greater the need for the discovery of new applications.

Lord Meston (president, E.D.A.), responding, expressed the hope that the Minister of Transport would live long both as an individual and as an official, and referred briefly to the future of electricity as an important factor in social and industrial life.

The Scientist and Society

Sir William Bragg (Hon. M.I.E.E.), also responding, said that scientists and engineers had done their duty, and it was incumbent on the rest of the world to take advantage of it. It might be that before long the scientist would be asked his views on the subject of social organisation.

The dinner ended a few moments before the scheduled time—a good enough indication that the speakers had not outstayed their welcome. This left all the more time for the reunion, which is always a thoroughly enjoyable part of the proceedings. How some well-known engineers and scientists appear when untroubled by work-a-day cares may be seen on another page.

It was difficult to realise that considerably less than 5 per cent. of the membership was present, as the gathering seemed to include everybody not only in London but also from the Provinces. Yet it was surprising to find on looking through the list of names that there were many that one had missed in the throng. That so big a function can take place year after year, with never a hitch and always with the maximum of enjoyment to members and guests, is a fine tribute to the work of Mr. P. F. Rowell and his staff. In addition to those already mentioned, the following were at table "A":—

Mr. W. B. Woodhouse (past president), Sir John H. Biles, K.C.I.E. (honorary vice-president, Institution of Naval Architects), Mr. Ll. B. Atkinson (past president; Hon. M.I.E.E.), The Rt. Hon. J. H. Whitley (chairman, B.B.C.), Dr. A. Russell (past president), Sir Murdoch MacDonald (president, Inst. Civil Engineers), Colonel R. E. Crompton (past president; Hon. M.I.E.E.), Sir B. N. Mitra (High Commissioner for India), Messrs. Ernest Brown (Secretary for Mines), John W. Dulanty (High Commissioner, Irish Free State), W. M. Mordey (past president; Hon. M.I.E.E.), Sir J. R. Brooke, C.B. (vice-chairman, Electricity Commission), Messrs. R. T. Smith (past president), W. Taylor (president, I.M.E.), J. S. Highfield (past president), F. Hodges, Sir Archibald Page (past president), Sir Holburt J. Waring (president, Royal College of Surgeons).

MEETINGS AND DISCUSSIONS

Current Topics and Opinions Expressed at the Institutions

Submarine Cables for Carrier Communications

THE electrical characteristics of submarine cables designed to transmit carrier frequencies are dealt with in the paper which Dr. E. W. Smith read before the INSTITUTION OF ELECTRICAL ENGINEERS at a meeting held in London yesterday (Thursday).

Test data are given and methods of obtaining them, both during and after manufacture, are described. Carrier communication will probably be extended; improvement may be looked for in new dielectrics having less leakance and in the adaptation of magnetic loading material.

The final performance of a carrier-frequency cable can be predicted with considerable accuracy from collected test data, most of which are obtainable from short experimental samples. The prediction is more certain than in the case of loaded telegraph cables, as there is no doubtful change of inductance under laying stresses to deal with, and the circuit resistance is independent of the presence of sea water and does not change with type of armouring.

A reduction of the maximum impedance irregularity, even by 50 per cent., would only increase the singing point of the cable from 51 to 57 decibels. Thus while improvement in this respect, even up to 60 decibels, is not impossible, the gain is likely to be incommensurate with the increased cost of manufacture, and the practical limit may be taken as about 50 decibels.

Duplex-channel Radio-telephony

In duplex-channel radio-telephony it is the practice to avoid reflected energy at the terminal stations by changing the condition of the apparatus to suit the direction of speech, this being done automatically by means of voice-operated delayed-action switches. This principle, if successfully applied to carrier-frequency cables as an alternative to the 22-type repeater circuit, would remove the limitation imposed on permissible attenuation by impedance irregularities. This limitation is also removable, at the expense of half the communication circuits, by the use of simplex-channel working, as in the case of the Key West-Havana No. 4 cable.

The net effect of plain copper teredo tape up to 30 kilocycles per sec. is to reduce, rather than increase, the resistance of the cable, and indicates that it is unnecessary to consider other means of protecting the insulation from marine boring organisms.

Teredo tape losses in twin cables appear to be due to induced currents flowing between the tapes on adjacent limbs, either by direct contact or through sea water, and may be reduced to small magnitude if a film of insulation is applied to the tape after winding. The only way to reduce the resistance of the centre conductor is by increasing its size, but it is unlikely that a weight of 600 or 700 lb. per nautical mile can be usefully exceeded.

The "Return Effect"

The "return effect" is principally due to the spirality of the return conductor and the incompleteness of the cylinder that it forms round the dielectric. Evidently, then, it being mechanically desirable to reduce rather than increase the number of separate members in the return, it is better to use flat tapes than wires. To reduce spirality effect the tapes should be applied with as long a lay as possible, while to preserve flexibility they should be narrow.

The addition of inductance by continuous loading appears to present great possibilities. The chief difficulty, the reduction of eddy-current losses, has been overcome by the manufacture of a loading tape only 0.001 in. thick composed of a nickel-iron alloy.

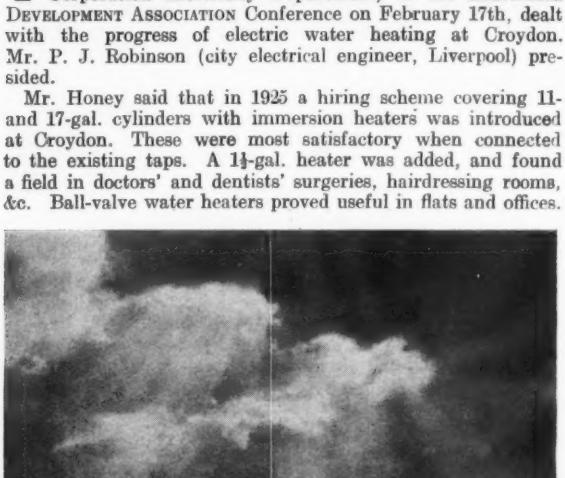
The most recent improvement in cable-insulating material in this country is "K-gutta" which consists of a mixture of de-resinified gutta percha or balata with up to 50 per cent. of petroleum jelly.

Concurrent work in America has resulted in the production of "paragutta," while "white tjipetir" is a pure gutta percha.

How Water Heating is Being Popularised

THE paper presented by Mr. P. G. Honey (of the Croydon Corporation Electricity Department) to the ELECTRICAL DEVELOPMENT ASSOCIATION Conference on February 17th, dealt with the progress of electric water heating at Croydon. Mr. P. J. Robinson (city electrical engineer, Liverpool) presided.

Mr. Honey said that in 1925 a hiring scheme covering 11- and 17-gal. cylinders with immersion heaters was introduced at Croydon. These were most satisfactory when connected to the existing taps. A 1½-gal. heater was added, and found a field in doctors' and dentists' surgeries, hairdressing rooms, &c. Ball-valve water heaters proved useful in flats and offices.



One of the grid lines viewed from the Northfleet, Kent, distribution station of the Central Electricity Board

The 11-gal. pressure type installed in series with an existing coal- or coke-fired boiler was very popular, and automatically reduced the demand when cold snaps brought heavy radiator loads.

Scale was the worst enemy, the local water supply having a total hardness of 18.5 degrees. The falling of scale soon choked the canister in which the elements of ball-valve heaters were immersed, causing burn-outs. The heaters were converted from restricted feed to bottom feed working on displacement, with the outlet at the top. A new element and thermostat were fitted for £3 15s. The watts per sq. in. of heating surface were restricted to 20, and interior parts were spaced by at least 1¼ in., so that falling scale would not build up around the element.

To make the immersion heater applicable to any kind of fuel-heated tank, a standard set of parts, consisting of element and thermostat flanges cast in two halves, was designed. The two flanges were bolted on the inside and outside of the tank, with a heat-resisting distance piece secured to the outside flange, then finished off with a collar flush with the match-boarding of the case surrounding the tank. The space between the tank and the case was filled with granulated cork. When the immersion heater was fitted vertically, the element was loaded more heavily at the bottom, which gave more even heating, with a fairly quick temperature recovery at the top of the tank. Thermostats were usually set at 160 deg. F.

The installation of immersion heaters was carried out by the undertaking, with the exception of the wiring and the replacement of tanks, which was usually given out to local contractors. The immersion heater had replaced the pressure type of water heater to some extent, but there was a field for all types. Lack of space in a small house often rendered the immersion heater the only practicable proposition. The reduction of price under the two-part tariff to 0.5d. per kWh during the six summer months had encouraged the water-heating business; the rate reverted to 0.675d. during the six winter months. The immersion heater had undoubtedly brought more business, and its low capital cost had encouraged builders to install electricity as an auxiliary means of water heating.

Hire and Energy Charges

Hire charges for self-contained water heaters ranged from 2s. per quarter (1½-gal.) up to 5s. 6d. (12-gal.); wiring and plumbing were extra. Immersion heaters were hired at 6s. per quarter, which included the supply and fixing of one or two 750-W elements, thermostat, lagging, and wiring up to 30 ft. Additional plumbing or new tanks were extras. When alternative switching of water heater and cooker was employed, a rebate of 2s. per quarter on hire rentals was allowed; the undertaking saved 1½ kW of extra demand when the cooker was in use. A special night tariff of 0.35d. per kWh between 11 p.m. and 7 a.m. had not achieved the success it deserved. At 2,000 kWh per annum per heater (averaging 1 kW) the load accounted for between four and five million kWh per year, or roughly 10 per cent. of the total output.

No capital expenditure had been necessary on account of the

water-heating load. The water heater did not suffer from the effects of low voltage as did the cooker, and with its lower maximum demand it would appear to be even more profitable. With the reconstruction of unsuitable heaters, maintenance costs were considerably lower than at first, and were very low for immersion heaters. Recorder chart readings indicated that the heating load did not coincide with the peak.

With thermostatic control the user would leave the immersion heater switched on ready for instant use; it would be advisable to leave the introduction of hand-controlled water heaters (which might be used only on the peak) until the automatic hot-water market had been thoroughly exploited. There was nothing to fear from gas in respect of storage heating. If the selling of electric water heating were regarded as a job for a specialist, the water heating load would be second only in importance to the lighting load.

In Other Towns

Opening the subsequent discussion, the chairman said that over 6,000 water heaters were installed in Liverpool, and in January 121 orders for new installations were booked. The Croydon 400 water heaters had been installed in the last ten months. Lieut.-Col. H. W. Watts (Epsom) said that recently in his area several blocks of flats had been fitted up with apparatus, including water heaters. The rental of 27s. 6d. per week included the hire of the apparatus, and the consumers paid ¾d. per kWh through slot meters. They consumed from 6,000 to 8,000 kWh per annum, and most of the water heaters were consuming 3,000 or 4,000 kWh. None of the consumers on the housing estates was using less than 3,000 kWh a year where water heaters were installed, and the water heating load did not come on the peak, except where there were young children.

Low Maintenance Costs

Mr. Logan (Aylesbury) said that as a cooker consisted of about 75 per cent. electrical apparatus its maintenance was higher than that of a water heater, of which about 25 per cent. was electrical. The efficiencies of cylindrical and rectangular tanks were approximately 92 and 74 per cent., respectively. Mr. Brown (Hackney) said that at Hackney electrical energy for use in connection with storage water heaters not exceeding 3 kW was available at 0.5d. per kWh,

The new refreshment room and council chamber at the Ilford Town Hall. **(See page 284)**

rate for water heating was ¼d. per kWh for the first 500 kWh per quarter, and 0.3d. per additional kWh, at which electricity could compete with any other method. The heaters were thermostatically controlled with 11 deg. F. between cut-out and cut-in, and there was no limitation as to time of use; in very few cases was the load ever on at the peak hours. He used six thicknesses of corrugated paper in preference to granulated cork to insulate tanks. Hire terms for heater and thermostat for an existing cylinder were 3s. per quarter, or for two heaters and two thermostats 4s. per quarter. In rural areas, where the water was extremely hard, the temperature was kept below 150 deg., and he had experienced no trouble. Where the pipe lines to a scullery were long he fitted separate 1½-gal. heaters.

Mr. W. Hainsworth (Croydon) said the night load at Croydon of 3,000 kW was mostly due to water heating. Ten years' life was a not unreasonable estimate for modern apparatus. In subject to the proviso that the energy might if necessary be cut off between the hours of 4 and 6 p.m. daily.

Mr. Honey, in replying to the discussion, said that a fairly wide range of thermostatic control would keep many water heaters off the peak. There was a great field in the electrification of flats. The Croydon undertaking had a contract for a block of thirty-one, and about three-quarters of them had electric water heating. The cheaper the electricity the less the disparity between the running costs of the self-contained and the immersion type, which was often the only one practicable.

The temperature of the water in self-contained heaters should not be more than 190 or 195 deg., and in the immersion type 160 deg. Small water heaters were de-scaled after about six months, and required cleaning more frequently than the larger ones, some of which had been in use for six years without de-scaling.

Wayleaves for Low-voltage Lines

AT the February meeting of the OVERHEAD LINES ASSOCIATION, "Difficulties in Connection with Overhead Lines and Electricity Supply" were discussed. Mr. H. Wilson, who introduced the matter, said that at Ashford he had adopted "P.B." poles with earth foundations for the intermediate positions, concrete foundations with stays for the 8 deg. and 25 deg. angles and terminals, and self-supporting towers for the 50 deg. and 70 deg. angles. Pin-type insulators were used wherever possible, and each pole was earthed independently.

The low price of copper had caused its adoption instead of S.C.A. He was offering the same terms for wayleaves as the Central Board had considered sufficient for its 33-kV lines; but which, he believed, had recently been reviewed after consultation with the National Farmers' Union. In his rural area he had made a rental charge based on the capital expenditure, subject to reductions depending on the amount of electricity used.

A Standard Form

Mr. W. Fennell (chairman, O.L.A. Wayleaves Committee) produced the O.L.A. standard wayleave form, the original draft of which was prepared in 1931. The aim, he stated, had been to produce a simple form, on the lines of that adopted by the Post Office. He had been using a similar form in Mid-Cheshire for some years. The form set out the payments to be made to the owners and tenants, and the Committee hoped that it would be generally adopted.

Mr. Theodore Stevens referred to a memorandum on wayleaves in rural areas issued by the Central Landowners' Asso-tion, the charges for wayleaves in which were much too high. With land having a rental value of 10s. per acre it would be cheaper, he said, to rent a strip of land one mile long and 85 ft. wide on which to place thirty-five poles, because the charge for that number of poles in this memorandum would be no less than 105s. Mr. R. B. Matthews said the Post Office had offered him 1s. per pole placed upon his 600-acre farm; this worked out at £1,000 per acre, and the poles did not interfere with farm work. In Bavaria, when a landowner appealed against the decision of a public inquiry concerning wayleaves, the question of the improvement of the value of the land, by reason of the availability of a supply of electricity, was inquired into. The O.L.A. wayleave form covered a different field from that of the C.E.B. form, and he hoped that the former would receive the approval of the Ecclesiastical Commissioners, the National Farmers' Union, the Surveyors' Institute, the Central Landowners' Association, and similar bodies.

Mr. Jocelyn Swan urged the National Farmers' Union to

regard the matter as one of advantage to the district generally rather than of how much could be obtained from the supply authority in rents. Major T. Rich stated that in Brandenberg (Germany), farmers were so convinced of the value of electricity that the standard wayleave form contained no price for poles, and a large proportion gave sites free for transformer stations. In Denmark 85 per cent. of the farms had a supply of electricity.

A Farmer's View

Mr. J. A. Sumner disagreed with the suggestion that consumers in rural areas should pay more than those in urban areas. Mr. J. G. Searle, representing the National Farmers' Union, said that when wayleaves were first applied for, some electricity authorities had not been too nice about it, and this had rankled with farmers. It was pleasing to hear Mr. Sumner say that farmers should not pay more than urban dwellers. In Cornwall there had been no wayleave delays due to farmers, but it was of little use expecting the farmer to spend, say, £150 in order to get a supply. There were many cases where it was only necessary to plough a furrow in soft ground to lay an underground cable, and farmers preferred that where possible.

Mr. W. Fennell said that in the Mid-Cheshire area the same price was charged in the country as in the town, because the low capital expenditure on the rural lines made the load nearly as advantageous. Mr. S. C. Bartholomew said the Post Office had developed a system of ploughing for the laying of cables in the manner suggested by Mr. Searle, a form of machine something like the mole drainer being used in combination with a cable drum, the cables being laid direct in trenches in the ground.

A summer meeting is to be held in North Somerset on Saturday, June 17th, when visits will be paid to sub-stations and overhead line work, finishing up at the Portishead power station and the grid sub-station. The date has been fixed to coincide with the closing of the I.M.E.A. Convention in Bournemouth.

The Lighting of Commercial Buildings

LOCAL lighting, if used for psychological reasons, should always be supplementary to general lighting, otherwise the contrast of intensity is tiring and harmful to the eyesight. This was one of the points made by Mr. H. C. Whert in his lecture last week on "The Lighting of Commercial Buildings" at the Conference for Architects at the LIGHTING SERVICE BUREAU.

Where more than a single lighting unit was required in a rectangular room, one should be placed at a quarter of the diagonal from each corner. The greater the ceiling height the further apart the units might be placed; the height spacing ratio might be worked out from a polar curve so that the illumination did not vary by more than 30 per cent. The position and number of points should be the same whatever the candle-power used. For larger offices with enclosing units, 2.5 to 3 W per sq. ft. would be required for general illumination, but for private offices 1.7 to 2 W would suffice. These figures could be reduced to two-thirds if local lighting also was used.

With the most suitable spacing for general offices, *e.g.*, 7 ft. for an area of 60 sq. ft. with 150-W lamps, and 20 ft. for 400 sq. ft. with 1,000-W lamps, the cost of lighting per sq. ft. per annum (500 lighting hours) would be from 1¼d. to 1½d. compared with rent, rates and taxes at 10s. per annum, and water at 1.67d. in London. Allowing 60 sq. ft. per person, the annual cost of lighting for each individual would be 6s. 3d. to 7s. 6d. per annum.

For effective built-in lighting at least 4 W would be required per sq. ft. of floor area. Candle-power is analogous to lb. per sq. in. and lumens to cu. ft. per min. Mr. Whert urged the necessity for co-operation between lighting engineers and architects in the earlier stages of the design of a building.

The Steam-jet Air Ejector

THE paper which Mr. F. R. B. Watson read before the INSTITUTION OF MECHANICAL ENGINEERS in London on February 15th consists mainly of an account of experiments conducted by the author on a steam-jet operated air ejector with the object of investigating certain quantities which, although they affect the vacuum produced, are not included in the theory of the ejector as it exists at present. The chief of these quantities is the distance from the outlet of the steam nozzle to the throat entrance of the diffuser, and in order to examine the effect of varying this length a special form of air ejector with a sliding diffuser was designed and provision was made for the use of a search tube which could be passed right through the diffuser and up to the nozzle outlet. In addition the author was obliged to carry out a separate set of experiments, with the diffuser removed, and in which an air pump created the vacuum, in order to examine the change in the stationary waves in the steam jet when it was discharging at different vacua. This was done by viewing the jet through a plate-glass window fitted into a part of the ejector.

Observations were made and photographic records were obtained at different outlet pressures ranging from atmospheric pressure to 27.5 inches of vacuum. These photographs are probably of interest in connection with steam nozzles in general, as they show the form of the jet when it was over-expanded and under-expanded as well as when it expanded to the designed pressure. The ejector was also operated normally with a glass mouthpiece forming the entrance and parallel throat of the diffuser, and this arrangement was used to view the waves in the throat at the higher vacua.

Another quantity which affects the vacuum is the length of the diffuser throat and the vacuum and steam-air ratio at different initial steam pressures for different designs have been recorded in the paper.

Probably the two best known applications of the air ejector are its use for producing and maintaining the partial vacuum in the cylinders and reservoirs of the vacuum brakes on railway trains, and its more recent application for the production and maintenance of the high vacua in the steam condensers of modern steam turbine installations, a duty to which it was first applied by Sir Charles Parsons in 1902, when he introduced his "vacuum augmenter."

The new Sphere Theatre, London. (See page 290)

Industrial Electrification

THE first of a series of five lectures on "Industrial Electrification" was given at the HERIOT-WATT COLLEGE, Edinburgh, on February 14th by Mr. H. V. Henniker. In an address Principal Smail said that with the development of the grid system industrial electrification would occupy many people for years to come. Enormous sums had been sunk in plant and equipment for the generation of electrical energy, and the use of the available energy in the best possible way could not be held back.

Mr. Henniker, after referring to the fact that, although the great majority of modern factories were electrically driven, there were still many employing obsolete methods of drive, pointed out that the best time to modernise methods of production was when trade was slack. Existing conditions presented the manufacturer also with the opportunity of equipping his works with the best British plant at lower prices than ever before, and he should take advantage of these conditions. Among the advantages of the electric drive were reduction in running costs, increase in production, convenience and economy in operation, greater reliability, low maintenance costs, flexibility of layout and ease of extensions, improvement in the product, increased safety and improvement in the conditions of operations, and saving in floor space and cost of buildings.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Protection from Shock

I was interested to note a letter from Mr. S. H. Parsonage having reference to the above, in which he inquired as to whether there might not be some hidden flaw in artificial earthing systems that is not immediately apparent from a superficial examination. I agree that the many advantages of such systems certainly appear too good to be true at first sight, but I can assure your correspondent that there are no catches in them. It is hardly likely that the largest supply undertaking in Europe would make such protective systems compulsory throughout its distribution systems and installations, following several years development of the methods, unless they completely filled the bill. There is nothing wrong with the systems, the fault is with the general apathy one meets with throughout the whole of the industry.

We cannot expect the supply authorities to be very interested, as they are too much concerned with the sale of energy and cheap installations to worry about a possible shock to the farmer, or the death of his cows and horses. (This has actually occurred recently on several farms in Wisconsin, with supply pressures of only 115 V, and occurred for years in Germany before the adoption of artificial earthing systems of protection.) Also, the use of the system might add a few shillings to the cost of the installation, which again is opposed to supply interests.

Regarding the contractors, I have suggested the formation of a small committee to examine the system and report upon it, but so far without result. Possibly something may happen in the future. Manufacturers, of course, will not put the necessary apparatus on the market until they can see a demand for it, and all our experiments and demonstrations have to be made with German gear such as I have described.

The Home Office engineers have made an independent examination of the system and have approved its use, whilst some of the insurance companies concerned with risks to farm stock are also now looking into the matter. There is no lack of interest in the system, as the problem of adequate protection, in rural areas especially, is world wide, and within the last few weeks I have been in communication with engineers in Australia, New Zealand, the U.S.A. (Michigan, Wisconsin, Pennsylvania), India, South Africa, and Alberta and Manitoba in Canada. It is very disappointing to have to refer these inquirers to a German firm to obtain their apparatus for test, and it certainly looks as if American engineers will adopt the system wholeheartedly.

May I ask Mr. Parsonage to continue his own investigations into artificial earthing, in which I should be happy to assist him, and when he is convinced of the complete efficacy of the system to use his utmost endeavour to spread the gospel throughout his immediate areas, as by this means something may be done at last.

It is evident that other countries are finding their difficulties with rural extensions after a few years' working, but we are hoping that we may start such rural developments on the right lines, and not lock the stable door after the horse has died—probably from shock.

T. C. GILBERT, A.M.I.E.E.

Folkestone, *February 18th.*

In your issue of February 3rd reference is made to the use of electrical apparatus in bathrooms. That fatalities still occur in bathrooms is due, in a great degree, to the *use* of unsuitable electrical apparatus.

Last summer I stayed at a well-known hotel in Cornwall. Although electricity had been installed in the hotel only in the last nine or twelve months, a switch with a *metal* cover controlled the electric light. One could very easily stand in the bath and operate the switch, and I drew the attention of the proprietor to this. I was amazed to learn that he himself had switched the light "on" and "off" when standing in the bath. He took my advice, and the switch was replaced by a suitable type almost immediately. How do the electrical authorities concerned propose to stop the general installation of unsuitable domestic electrical appliances in the home so as to prevent electric shock to the user of portable appliances?

I should like to make two suggestions:—

(1) That the fitting or use of any switch or apparatus in bathrooms, unless efficiently protected by an insulating covering, should be strictly prohibited.

(2) That the difference of potential across the terminals of portable domestic appliances should be reduced to a safe value, to be determined by a committee of electrical and medical experts.

It is a very simple proposition to step down to a safe working pressure, as the standard supply will be 230 V a.c. No doubt this suggestion will be serevely criticised, but what other protection can be given to the public?

To my mind, the earthing of all metal coverings is quite all right when the apparatus is first installed, but the home user cannot be expected to know whether or not the earthing system is always satisfactory, and it would require a body of inspectors to make tests and examinations at frequent intervals to satisfy these requirements.

SAFETY FIRST.

Handsworth Wood, Birmingham, *February 15th.*

A new type of Ediswan lamp and reflector has just been installed throughout the Dental Department of Guy's Hospital, London

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Distribution and the Small Undertaking

In your last few issues the small undertaking has received a good deal of adverse criticism. Seemingly it is to be the scapegoat, and is being prepared for sacrifice, in case matters do not go well with the grid scheme. The argument apparently is that the grid has made electricity available in bulk—at a very limited number of points—and any lack of success will be due to the small sales by distributors. It seems to me that the Central Electricity Board is in much the same relation to its distributors as the engineer to his consumers. What steps have been taken under the national scheme to promote distribution and to help the small distributor? For years small undertakings have been unable to obtain loans for new generating plant, and nothing has such an adverse effect on expansion as the possibility of not being able to meet next winter's load.

The engineer of a small municipal undertaking often cannot extend his mains into surrounding territories as someone else may hold prior rights. A Special Order probably takes over a year to secure and perhaps then only gives competitive powers. Fringe Orders for a limited number of consumers are useless for general development as they give no security. The greatest difficulty is probably that many rural districts are not financially attractive. It has been suggested that distribution might be handed to the big power companies. Has their record been blameless and will they be prepared to produce for use rather than profit? Again, national ownership has been hinted at as the only solution, but would this be very likely to give cheap electricity?

How would it be possible to help the small undertakings?

(1) By *delivering* energy at a rate which would enable them to sell large quantities per head and improve their load factors. It seems to be insufficiently realised that the grid delivers only to three or four points in a county. The

price at the grid points may be increased by 40 or 50 per cent. either through having to buy through a middleman or by the cost of transmission lines; the cost of electricity may thus be more than it would be with local generation, and this may preclude the undertaking from retaining or acquiring consumers, who will not pay the high kW charge which has to be passed on to them. If electricity is ultimately to be sold at a uniform price throughout the country, will not the price from wholesaler to retailer have to be uniform? Also all authorised undertakings will be proportionately responsible for any deficit on the national scheme, whatever their geographical position. Uniform levy should mean uniform price. Consumers in the same borough wherever they live expect to buy their energy at the same price *because* they contribute equally through the rates to make up any deficiency in the electricity funds.

(2) The scrapping of any prior rights outside municipal areas which have not been exercised in the last three years; this would mean legislation, but so will any scheme to put matters right.

(3) The provision of money at the lowest possible rate of interest, or better still, by State-paid capital charges on approved extensions for the first five years. Perhaps after all the national scheme started at the wrong end; the money could have been spent in subsidising distribution and making a supply available to all.

(4) With the aid of cheap money or subsidy, and with permission to carry out extensions underground (which would avoid delays and would absorb a very high percentage of unskilled labour), many municipalities would extend to provide work for the unemployed.

(5) I serve a small municipal undertaking whose committee has appreciated its responsibilities, selling electricity at such rates that a consumer anywhere in the district, who uses the supply for light, cooking, and water heating, *or* occasional room heating, can purchase the whole of his requirements at an all-in rate amounting to less than a penny per kWh.

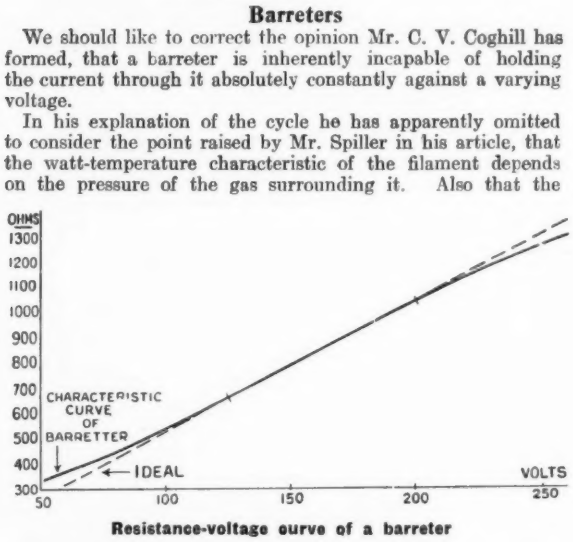
H. WILSON, *Chief Engineer*,
U.D.C. Electricity Dept.

Ashford, Kent, *February 16th.*

Barreters

We should like to correct the opinion Mr. C. V. Coghill has formed, that a barreter is inherently incapable of holding the current through it absolutely constantly against a varying voltage.

In his explanation of the cycle he has apparently omitted to consider the point raised by Mr. Spiller in his article, that the watt-temperature characteristic of the filament depends on the pressure of the gas surrounding it. Also that the



Resistance-voltage curve of a barreter

barreter will be in an unstable condition until a complete thermal balance is obtained. In support of this we send a resistance-volts curve of a Philips barreter (Type 1928). Between the limits of 120 and 200 V, the working range of the barreter, it will be seen that " the resistance is proportional to the voltage."

PHILIPS LAMPS, LTD.
C. Richards, *Radio Technical Department.*

London, W.C.2, *February 16th.*

Engineering Apprenticeship

Like " Pater," my father was a man of moderate means, and the question of a university course was first considered, but ultimately it was decided to apprentice me to an electrical firm of repute, a premium of £50 being required, although in my opinion this was wasted, as the ordinary apprentice stood as good a chance of all that was going. It was also agreed that I should either study at the local college evening classes or take a correspondence course; I did both, but finally dropped the latter as I found the evening classes more satisfactory.

My apprenticeship was for a period of five years, *i.e.*, 16 to 21, the rate of pay rising from 5s. to 15s. weekly. For this period, being away from home in lodgings, it roughly cost my father £600 for board, clothes, and general necessities, including premium and college fees. " Pater " could reduce this by half if his son lived at home.

On completion of my apprenticeship I served a further two years on the test bed as improver at a salary of 30s. weekly. Shortly after this I obtained my first post with another firm at £175 per annum at the age of twenty-three. This firm being in London it was an easy matter for me to continue my studies until I eventually qualified. With regard to the alternative, the university training succeeded by a works course, I have had a little experience with this in the way of employing students during their vacation and after they have graduated. The salary is, as has been suggested, in the neighbourhood of £2 a week. One usually finds, however, that they cut short their works course to a maximum of three years on account of their age; hence, in my opinion, they have not obtained so good an all-round education at the same age as the apprentice who has had the additional five years' practical experience to start with.

In the case of the apprenticeship a great deal depends upon the district in which the firm is situated, and whether it is near enough for the individual to reach his home daily, also whether there are facilities for evening study, and, finally, whether he is prepared to study night after night, as I found it necessary in my case, after probably a hard and long day's work in the shops.

A.M.I.E.E.

February 20th.

Contactor Starters

There appears to be considerable diversity of opinion among your various correspondents on this subject; as we have had experience with starters extending over thirty years, we may perhaps be permitted to add our views.

The discussion was initiated by " Dilemma " in your issue of January 6th, who put a question which paraphrased is— " What is the advantage of contactor as compared with hand operated starters (omitting the question of remote control)? " The various merits and demerits of contactor starters have been put forward. We are in agreement as to the former, but as to the latter, such as that they are flimsy and generally too small for the job, it is our experience that they can be, and actually are, made quite as robust and of ample capacity. In the case cited by " Dilemma," namely, simple " direct on " starters, either type is equally suitable, but in other cases such as star-delta, auto-transformer, combined stator and rotor, and all forms of d.c. starters, hand operation involves more or less skill whereas the contactor requires no skill whatever. It is for this reason that there is a tendency to make hand operated starters unduly " robust," but when correctly designed the contactor gives less trouble, and we are in entire agreement with Mr. W. J. Donovan, who speaks of the little maintenance which they require.

The advantage of remote control is not always remembered, though it is becoming more recognised; further, even where the control is local there is the facility of placing the contactor near the motor or on an adjacent wall leaving the push-button only to be placed near the operator.

" Dilemma " also raises the question of overload devices, stating that thermal overload devices are generally fitted to contactor starters and are less robust than the solenoid type. Here again thermal overload devices are not confined to contactor starters and are frequently used on hand-operated starters. They are quite reliable when properly designed, and in our experience can usually be set to operate at much finer limits than the solenoid type.

WILLIAM GEIPEL, LTD.

London, S.E.1, *February 20th.*

Service Charges

I should be grateful if any of your readers could give me any information regarding the legal aspect of the question of service cables. I ask the question purely from an electrical progress point of view, as the local company charges the exorbitant sum of 8s. 6d. per yard for a three-core 0.0225 service cable, while I would be prepared to lay the same cable at 4s. 6d. per yard and incidentally get rich quick at the same time.

Is it permissible for me to supply the service cut-outs and lay the cable to the boundary between the private property and the public road, and to demand that the cable shall be connected to the company's main? If the company laid the service the meter would be at the house-end of the cable; can I demand the same position for the meter if I lay the cable?

If my suggested scheme is wrong, and there is no authority to make the supply company come down to reasonable charges, electrical progress in this area is destined to remain moribund.

February 17th. PRO BONO PUBLICO.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

New Rectifying Units

Several new rectifying units for converting d.c. radio receivers to a.c. working have been developed by MESSRS. WILLIS & CO. (MERITUS), LTD., 461a, Caledonian Road, N.1. The 200-mA model is of special interest, as it is suitable for a large number of new types of d.c. sets. The 150-mA model is also new The 300-mA and 120-mA models previously listed have been entirely redesigned, resulting in reduction of the "ripple volts" hum level to less than 0.27 per cent. of the output which is standardised at 230 V. All units are housed in stove-enamelled sheet-iron cases complete with fuses and switches and comply with the I.E.E. Regulations in all respects. The price of the 300-mA model is £10; the 200-mA type, £7 5s.; the 150-mA type, £6 15s.; and the 120-mA model, £6.

A new Willis rectifier

An Electric Erasing Machine

The eraser recently introduced by MESSRS. B. J. HALL & CO., LTD., Stourton House, Dacre Street, S.W.1, is of electrical interest, not only as it is an electrical machine, but because draughtsmen and all concerned with the keeping of records, &c., should find it a useful time saver and paper and cloth preserver.

The eraser proper is held in a chuck carried on the shaft of the high-speed universal motor, and the results achieved depend on the speed rather than on pressure on the paper or cloth; indeed it is barely necessary to allow the eraser to take the weight of the machine. The result is removal of the mark with negligible damage to the material.

There are two speeds, the low one being useful for cleaning up. The machine is constructed in "Bakelite" and weighs 24 oz. It is priced, complete with erasers, at £3 17s. 6d., and spare erasers cost 6s. per gross.

The Hall electrical erasing machine

An Electric Geyser

Particulars are now available of a new electric geyser marketed by the CALOTHERM CO., 23, King Street West, Manchester. The geyser is controlled by an ordinary water tap, the electrical circuit being made and broken by a switch operated by the hydraulic action of the water, passing through the upper orifice of the tap. The heater is, therefore, "on" only when water is flowing out of the tap, and should the water supply fail the electric current is cut off automatically.

There are three sizes—1½, 2 and 3 kW, for 200-250 V. The elements are easily replaceable and are sheathed from the effects of damp. A T-piece is supplied so that the cold water tap and the rose point in the same direction over the hand bowl. Adjustments can be made to suit any pressure.

The Calotherm geyser

A Chromium Cleaner

Chromium plating is not generally considered to need any cleaning beyond an occasional rub with a damp leather, but there are times when, through staining, something stronger is necessary. Ordinary metal polish is liable to spoil the surface of the plating, and to meet the purpose the new "Chemico" cleanser has been prepared. The retail price is 1s. a tin, and it is obtainable from the COUNTY CHEMICAL CO., LTD., Chemico Works, Bradford Street, Birmingham.

Short-circuit Indicator

For localising short-circuited turns in instrument coils, the ANGLO-SWISS ELECTRICAL CO., LTD., 15, Victoria Street, S.W.1, has introduced to the British market an indicator comprising four coils mounted in pairs on two iron cores contained in an insulated test rod and coupled magnetically to the coil under test, constituting a bridge. A current is induced in any short-circuited coils, thus altering the impedance of this arm of the bridge; as the coils in the two opposite arms work together the change of impedance is doubled. The indicating instrument

The Trüb Taüber short-circuit indicator

is a sensitive ferro-galvanometer with an a.c. field; the position taken up by the pointer depends solely upon the current induced in the moving coil. The energy taken is about 45 W.

The deflection of the pointer is almost proportional to the number of turns short-circuited, and is inversely proportional to their ohmic resistance. The instrument has six terminals and is supplied complete with a two-pin plug, 6 ft. of twin flex for connecting the supply, and 3 ft. of four-core flex for connecting the test rod to the instrument.

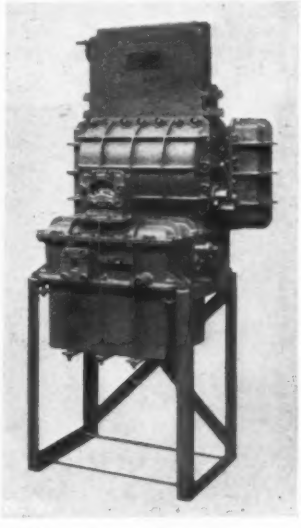
A Soldering Paste

"Quixsol," recently introduced by the RUNBAKEN MAGNETO CO., LTD., 280, Deansgate, Manchester, 3, is a paste containing both the soldering metal and the flux. It is only necessary to spread a little of the material on the article to be soldered and apply heat. It is sold in tins costing 1s. 6d. each and holding sufficient material for 200 average electrical joints.

Flame-proof Ironclad Switchgear

The latest range of flame-proof switch units made by MESSRS. ERSKINE, HEAP & CO., LTD., Lancashire Switchgear Works, Cardine Street, Broughton, Manchester, has been tested at the Mines Department Testing Station, Buxton, and is certified to comply with the definition of "flame-proof enclosure" of B.S.S. No. 229-1929.

Mechanical interlocks prevent access to the interior of the switch unless it is in the "off" position (with the isolator open and the outgoing side earthed, when these are provided for), or the closing of the isolator until the covers and tanks are in position and the switch is "off." Earthing contacts (when supplied) are part of the switch unit and no separate earthing plugs are required. Each compartment of the unit is sealed and is strong enough to prevent the spreading of an explosion from one compartment to another. The flame-proof quality of the busbar chamber is independent of the end plates.



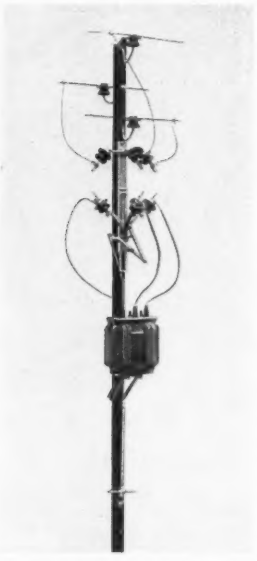
"E.H." flame-proof switchgear

Trifurcating chambers can be removed without the flame-proof character being destroyed and without making it necessary to dig out the compound. Special chambers are provided for the inclusion of measuring instruments. Oil indicators are fitted, but no vents are required to relieve pressure. Basic prices, including free handles, two overload trips, floor stands and terminal chamber (without glands) are £40 for the 300-A sizes, with 150-A starters, for 3,300 and 600 V, and £14 for the 100-A size with 50-A starter for 600 V. Extras such as interlocked isolators, earthing devices and meters can be supplied.

An E.H.P. Pole Switch

An 11-kV push and pull switchgear outfit recently introduced by the YORKSHIRE SWITCHGEAR & ENGINEERING CO., Ltd., Grove Mills, Meanwood, Leeds, is intended particularly for use in rural electrification schemes, and provides a cheap

means of controlling a small pole transformer or short spur line supplying a small transformer such as is required for farm, large house, or small village supplies. Being fitted with insulators of British Standard rating, but with an extra long creepage path, it is suitable for use at the rated voltage under very exacting conditions.



A push and pull 11-kV pole switch (open position)

The insulator characteristics are: dry flashover, 96 kV; wet flashover, 64 kV; puncture, 166 kV; and creepage, 13⅜ in.

The equipment is mounted upon a steel channel base adapted for fixing vertically to the side of the pole by two bolts. This base carries a bracket with three arms to which the three fixed insulators are fitted in inverted position, with the fixed contacts and line terminals mounted at their lower ends. The base also carries guides for a sliding frame to which is fitted a bracket arm with three insulators carrying the moving contacts, with terminals for flexible connections to transformer, fuses, or a branch line.

A lever, pivoted upon a lug attached to the side of the base channel, is connected by links to the sliding frame, and is operated by a rod fitted at its lower end with an insulating section of wood, with cross handle and locking gear arranged to padlock with the switch in either "on" or "off" position. All the steel and iron parts are heavily galvanised, and the weights of the parts are such that the switch will return to the open position by gravity should it be left unlocked or should a rod be broken. Complete with pole bolts, operating rod, and handle, a three-phase set costs £12 10s.; single-phase, £11. A similar switch fitted with fuses is available.

A New Switching Kiosk

Primarily for rural electrification schemes, MESSRS. FERGUSON, PAILIN, LTD., Higher Openshaw, Manchester, have designed an interlocked switching kiosk incorporating a round-tank series-trip "BRM" oil circuit breaker with vertical isolation; no additional isolators are necessary. The kiosk is fabricated in sheet steel and steel sections. The breaker is balanced by a sliding weight to which is hinged the bottom sheet of the kiosk, so that the minimum effort is required for raising and lowering it. An automatic catch on each side of the breaker holds it in either the "plugged-in" or "isolated" position. These catches may be pre-set so that they engage or disengage as required for the next operation of an endless chain.

The Ferguson, Pailin interlocked switching kiosk

The oil circuit breaker which is rated at 100 A 11 kV, has been tested on short-circuit. The standard arrangement includes triple-pole overload trips, the individual mechanisms, one per phase, being mounted on the top of the front terminals of the breaker. The tripping mechanism is coupled to the manual closing lever gear by insulating links.

A new system of tripping by means of a gas-expansion device with an element (that can be renewed within a few seconds) is employed. Inside the element is a heater strip connected in series with the main supply and surrounded by a substance which gasifies immediately the strip reaches a temperature of 287 deg. C. The expanding gas gives a powerful, positive, and rapid trip, at the same time actuating a positive interlock which prevents the breaker being reclosed until the element is replaced. The heater strip will not fuse and cause a power arc in the element, as immediately the gas expands it is automatically short-circuited.

The overload trips have an inherent inverse time-limit characteristic and the elements are unaffected by damp. Positive tripping is obtained at low current values, and the tripping force is enough to prevent the breaker sticking; a close ratio of tripping to normal current is obtained.

Interlocks prevent the breaker from being removed to or from the "plugged-in" position until the breaker is in the "off" position. As the breaker is lifted by the tank, it cannot be plugged in except with the tank in position. Should the breaker be tripped by one of the elements it cannot be reclosed until the element has been replaced. Cable boxes can be provided as an alternative to the bell type insulators.

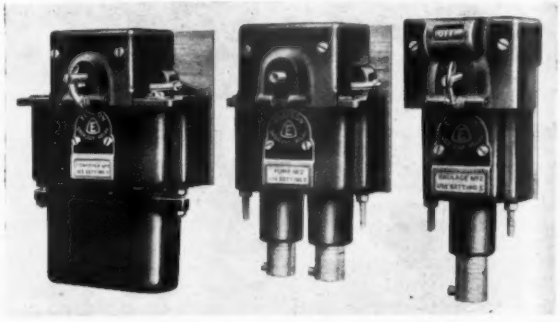
As a pole-mounted unit, the bottom of the kiosk is 6½ ft. from the ground level. The kiosk may be mounted on a single pole, an "A" pole, or an "H" pole, or may be arranged for floor mounting.

After tripping, the circuit breaker is lowered by the balanced mechanism to an isolated position for the element to be renewed, but it is not necessary to open up the tank to renew the element. The time taken to replace an element and to put the breaker back into commission is one and a half minutes. Three spare elements are supplied with each equipment, and spent elements are recharged at the works at a small cost.

Overload Relays

The solenoid principle and construction employed by MESSRS. GEORGE ELLISON, LTD., Perry Barr, Birmingham, for the overload relays on their switchgear has been adopted for a range of independent relays for use with contactor-type starting gear or as additional overloading safeguards.

There is an enclosed type for currents up to 20 A, and a semi-enclosed model for currents up to 120 A. In the former there is a self-resetting trip switch for breaking the circuit



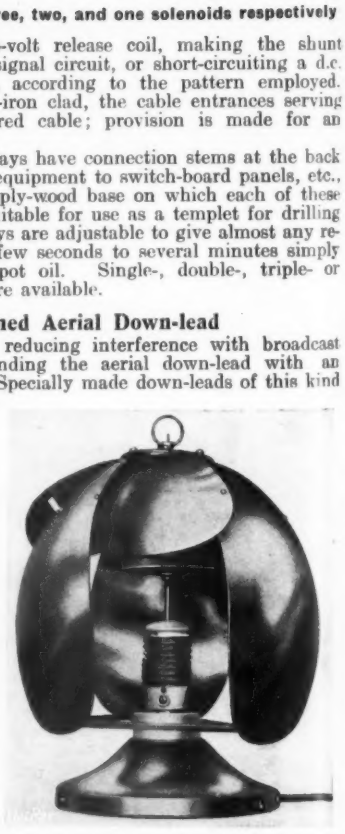
Overhead relays with three, two, and one solenoids respectively

of the contactor or no-volt release coil, making the shunt trip breaker coil or a signal circuit, or short-circuiting a d.c. starter no-volt release, according to the pattern employed. The time lags are cast-iron clad, the cable entrances serving for conduit or armoured cable; provision is made for an ammeter at the top.

The semi-enclosed relays have connection stems at the back suitable for fixing the equipment to switch-board panels, etc., up to 1¼ in. thick. A ply-wood base on which each of these relays is delivered is suitable for use as a templet for drilling the panel. All the relays are adjustable to give almost any retarding action from a few seconds to several minutes simply by changing the dashpot oil. Single-, double-, triple- or quadruple-action lags are available.

A Screened Aerial Down-lead

One of the ways of reducing interference with broadcast reception is by surrounding the aerial down-lead with an earthed metal screen. Specially made down-leads of this kind are obtainable from MESSRS. WARD & GOLDSTONE, LTD., Frederick Road, Pendleton, Manchester. The stranded copper aerial conductor is insulated with rubber and passes down, through a "Bakelite" weather cowl at the top, a "Bakelite" tube in which the conductor is centralised. The tube consists of dome-shaped shells arranged end-to-end in vertebral segment fashion for flexibility, the whole being enclosed in a woven wire sheath, which is earthed. The segmental separators are perforated to reduce leakage from conductor to outer sheath, dielectric loss and capacity effects. With a metal-braided outer cover of 0.75 in. overall diameter the capacity is of the order of 23 $\mu\mu$F per foot. A 10-ft. length costs 12s. 6d. and a 3-ft. length 3s. 6d.



The improved "Rotaheat" fire marketed by the Horstmann Gear Co., Ltd., Newbridge Works, Bath, at £1 10s. The reflectors revolve slowly round the 750-W element

Progress in Electrical Research

FOLLOWING the annual general meeting of the British Electrical and Allied Industries Research Association, which was held in London on February 15th, the customary luncheon was served at the Savoy Hotel.

The loyal toast having been honoured, Prof. E. W. Marchant, president I.E.E., proposed "The E.R.A.," whose work, he said, had been of very special value and assistance to the industry. The grant which the I.E.E. made to its funds was a sound investment which earned a very high rate of interest.

Mr. R. P. Sloan, who occupied the chair, replied with his presidential address, in the course of which he said that over one hundred firms were represented in the *personnel* of the E.R.A. controlling committees, and some manufacturers were spending over £100,000 a year on research.

More Support by Supply Authorities Needed

Electricity suppliers were, technically, manufacturers also, and their product had its economic problems. If the electricity supply authorities had not had an effective voice in the control of E.R.A., which could only be secured by their contributing to its funds, the benefits they had enjoyed would not have accrued. These benefits could not, Mr. Sloan emphasised, have been secured but for the close co-operation between manufacturers and supply authorities which the E.R.A. made possible.

The recommended scale of subscription was moderate, being equivalent to only £1 for each £2,500 of annual revenue from the sale of electricity, excluding bulk supplies. The number of supply authorities which subscribed upon the scale recommended was increasing, but a large number still failed to bear their share of the burden. One did not like to think there were supply authorities which stood by knowing that they would reap benefits of work done by the Association without contributing towards its funds, or by contributing only a fraction of what might reasonably be expected.

There had been, and still was, a tendency for some supply authorities to withhold support from certain objects unless they were convinced that individually they would gain some definitely ascertainable benefit. They had no interest in popularising the use of electricity generally. What they wanted was to popularise it in their own particular areas, and what happened outside was no concern of theirs. Such an attitude in the past might have been described as merely "a narrow view," and left at that. The advent of the national scheme had made this attitude untenable. Anything which helped to reduce costs or popularise use in any quarter must help to increase sales, and such an increase was vitally important to the ultimate success of the national scheme.

To-day the Association received from supply authorities only 55 per cent. of the amount it would get were the "scale" basis adopted by all. While the additional amount was small, it would represent an important increase in the Association's income, since it already had in being an efficient organisation and the work which that additional income would allow would be very material.

The Association's Annual Report

The twelfth annual report indicates that the problems which presented themselves during 1932 greatly exceeded the Association's resources for investigation. The work accomplished has been good, and the activities are so wide that the specialist committees which guide the investigations now number over seventy. This has made it necessary to broaden the financial basis too, and during the last two years a satisfactory start has been made.

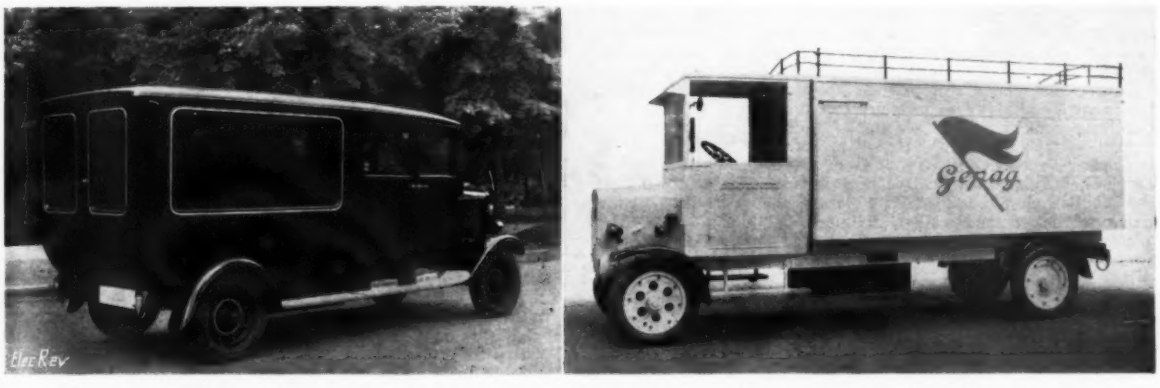
The major monetary contributions are now made by electricity supply companies, municipal undertakings, railway groups, and others who are not in the manufacturing section of the industry. This tendency has induced E.R.A. to review the basis of its appeal to manufacturers, represented by B.E.A.M.A., who were the mainstay of the Association in the early days.

The income was somewhat larger than in 1931, as there was a substantial increase of contributions from authorised undertakings. The Association has maintained its position and preserved its organisation intact. The completion of certain outstanding researches has been expedited and plans for future work have been brought to an advanced stage.

Besides researches leading to the production of specifications of performance which, in many instances, subsequently form the basis of Specifications issued by the British Standards Institution, material progress has been made during the year towards ascertaining the real properties of dielectrics as distinct from empirical measurement of their behaviour under given conditions. Numerous commercial problems are under investigation, *e.g.*, the study of radio condensers in co-operation with the British Broadcasting Corporation and members of the Radio Manufacturers' Association.

Important Discoveries

The systematic study of creep of metals is contributing important knowledge, and work on the properties of steam is also of high importance. Other studies relate to the behaviour of pole foundations, wind pressure on overhead lines, heating of deeply buried cables and cables in ducts, and numerous incidental problems, such as those connected with the armouring and bonding of protective coverings and efficient earthing. Under all these heads, important conclusions have been reached during the year. Work on the design and use of concrete poles should enable the Electricity Commissioners to reconsider the present stringent regulations which govern the use of these poles.



This German coach and lorry are electrically propelled vehicles built on ordinary automobile lines. **(See page 295)**

A study of the heating of connections to large incandescent lamps has led to improved construction which should go far towards removing the difficulties experienced in the past and add materially to safety and reliability.

Further advances in the development of new types of circuit breaker have been made, this work being well abreast of research in competing countries, and some E.R.A. devices are going into commercial production.

The problem of calculating interference between power and communication circuits may now be considered solved, and the requisite data are being reduced to a form capable of direct application in a simple manner to working conditions. The results of theory have been amply confirmed by practical experiment.

Good progress has been made with the study of problems of importance in railway engineering, in connection with magnetic materials, the phenomena of electrical surges, and indeed in many other directions too numerous to mention, the printed schedule of headings alone under which researches are being conducted now running to twenty pages.

The accounts for the year 1932 bear reference to a loss incurred by the subsidiary company, E.R.A. Patents, Ltd., which was formed to negotiate sales and licences under patents taken out by the Association. It has incurred certain expenses, leading technically to a "loss," as there is as yet no revenue. The company has, however, recently received a number of applications for licences from members of the Association and others, and it is expected that there will shortly be revenue from these.

In the Courts

IN the Court of Appeal on February 16th, before the Master of the Rolls and Lords Justices Lawrence and Romer, the hearing was continued of the appeal of Messrs. Handcock and Dykes, consulting engineers, from the declaration granted by Mr. Justice Luxmoore recently in the action which they brought against the London & Home Counties Joint Electricity Authority and the Leatherhead & District Electricity Supply Co., Ltd.

Mr. Miller, K.C., for the appellants, submitted that the declaration should be varied by directing that under the proper construction of the agreement the defendants were liable to pay to the appellants in each year during the currency of the agreement a sum equal to 5 per cent. upon the capital outlay (excluding the cost of land) laid out in extensions, reconstructions, or conversions in connection with the undertaking, and that an account should be taken on that basis. He said that the appellants were always ready and willing to do that work and were indeed anxious to do so but the defendants alleged that their services were not required because the work could be done by their own staff.

Mr. Spens, having supported the judgment of Mr. Justice Luxmoore on behalf of the respondents, the Master of the Rolls, in the course of his judgment, said that the pleading of the respondents averred that the defence was a denial of liability under the agreement but at the trial the liability of the defendant authority was admitted. He thought that the judge was right, that his judgment and the declaration which he had made should be affirmed and the appeal dismissed with costs. The Lords Justices concurred.

An Employé's Investment

In the King's Bench Division on February 15th, before Mr. Justice Swift, Mr. Robert Rutherford, Crouch Hill, N., claimed to recover £200 from Mr. William Duke, Upper Hornsey Rise, N.

Mr. Havers, Counsel for the plaintiff, said there were two defendants, but one of them, the Terrytone Radio Products Co., Ltd., had entered no appearance and the action now proceeded against Mr. Duke alone. Early this year a winding-up order was made against the Terrytone Co. The plaintiff, had answered an advertisement for a manager of the hire-purchase department of a firm of radio contractors stating "good salary; one able to invest preferred." The plaintiff applied and received an answer from Mr. Duke written on the Terrytone Co.'s notepaper. Ultimately it was arranged that the plaintiff should take £200 worth of shares in a new company to be formed called Sellmore Supplies, Ltd. The plaintiff made out a cheque to the Terrytone Co. which was handed to Mr. Duke, who at the material time was a director.

Mr. Rutherford never received any shares in the new company, most of which were held by Mr. Duke's wife. For a short time Mr. Rutherford had a salaried position on the technical side of the Terrytone Company's business.

The plaintiff having given evidence, Mr. T. F. Davis, for Mr. Duke, said the only question to be decided was whether a director (Mr. Duke) was personally liable. The cheque was made out to the Terrytone Co., which had the money.

Mr. Duke having given evidence his Lordship gave judgment for Mr. Rutherford for the sum claimed with costs.

"An Unfortunate Mistake"

In the King's Bench Division on February 17th Mr. Justice Swift heard an action brought by Warner's Radio, Ltd., of Wood Green, N., against Lotus Radio, Ltd., of Liverpool, to recover damages for an alleged illegal trespass.

Counsel for the plantiffs said the plantiffs carried on business as radio retailers in close connection with Essex Radio, Ltd., Bishopsgate, E.C., radio wholesalers. At one time the Essex Radio Co. owned the Wood Green premises, but on the creation of the plaintiff company the latter took them over. In December, 1931, the Lotus Co. obtained a judgment against the Essex Radio Co. and on February 13th, 1932, put the Sheriff into possession of the company's premises in Bishopsgate. The Sheriff was paid out and withdrew, but two days later another Sheriff of Middlesex wrongfully took possession of the Warner's Radio Co.'s premises and stock at Wood Green. According to Counsel this seriously damaged the plaintiff company's business, and it had now been closed down.

The defence was that the Wood Green premises never belonged to the Essex Radio Co.

After hearing the evidence his Lordship, in giving judgment, said that the Lotus Radio Co., through an unfortunate mistake had been guilty of committing a trespass through the action of the Sheriff; but he did not think that the plaintiff company had suffered any pecuniary loss. He awarded that company fifty guineas damages.

Appeal in the Radiovisor Case

In the Court of Appeal, consisting of Lords Justices Scrutton, Greer and Slesser, on February 15th, the case of the Radiovisor Foreign & Colonial, Ltd., against Radiovisor Parent, Ltd., was heard on the appeal of the plaintiff company from the judgment of Mr. Justice Lawrence in the Chancery Division in favour of the defendants and dismissing the plaintiffs' claim for £200,000 damages and the return of 100,000 £1 shares. The claim was based on alleged misrepresentation when defendants sold the plaintiff company the foreign rights in a selenium light bridge. The defendants denied both misrepresentation and damage.

Sir William Jowitt, K.C., for the appellants, said that the plaintiff company had entered into the contract relying on what it was told and what knowledge it could bring to bear on the subject matter of the invention. He asked the court to reverse the decision of the judge on what was largely a question of fact. The chief person who was said to have been guilty of deceit was Mr. Neale, the inventor. There was no doubt that the representations he made were in fact untrue. The second question was whether at that time they were made ruthlessly. The final point was whether the plaintiffs were induced thereby to enter into the contract. Mr. Neale had not been called to give evidence and it was said that he was in Africa.

At a later stage, dealing with the evidence given at the trial, Sir William said that his witnesses who had testified as to what they saw at the demonstration of the invention were people of intelligence, and on the faith of what they saw advanced substantial sums, one man putting in over £40,000.

Lord Justice Slesser remarked that it might be right to say that both parties were right in their point of view, but misunderstood one another.

Parliamentary Notes

(BY OUR SPECIAL REPORTER)

ON February 15th, in the House of Lords, Lord Buckmaster moved: "That in the opinion of this House the duties of the Ministry of Transport could be better discharged by the Home Office and the Board of Trade, and that it is in the public interest that the said Ministry should be dissolved and its functions distributed among other departments." He said that the Ministry had already twice received sentence of death, and there was no reason why execution should be longer delayed. The expenses of the Ministry were £333,000 a year, and the indirect expenditure due to its operations was also very great. The Ministry had failed in most of the purposes for which it was set up, and had done nothing to increase safety on the roads.

Lord Londonderry, replying for the Government, said that it was a mistake to suppose that the abolition of the Ministry would save to any great extent expenditure that was at present incurred. What would happen would be the superimposing on other departments of a considerable volume of work. The Ministry had the Electricity Supply Act of 1926 to administer, and also the Road Traffic Act of 1930, which imposed a wide range of duties.

The motion was carried by 31 votes to 26.

Alleged Irregularities at Ardwick-le-Street

On February 16th Mr. Molson asked the Minister of Health with regard to the special audit which he ordered of the accounts of the electricity undertaking of the Adwick-le-Street Urban District Council, whether any irregularities were detected; whether any members of the Council or officials thereof had received electricity or electrical appliances free or at an unduly low price; and whether any action had been or would be taken in regard to this matter.

Sir Hilton Young said the answer to the first and second parts of the question was in the affirmative. The irregularities were, however, of a minor character, and he was satisfied that they were due to an error of judgment on the part of the official concerned. He was informed that the small amounts due had been or would be recovered and that steps had been taken to prevent the occurrence of similar irregularities in future.

Railway Electrification

On February 20th Sir Philip Dawson asked the Minister of Transport whether, since the third reading of the London Passenger Transport Bill, he had received any definite undertaking from the London and North-Eastern Railway Co. that it would proceed with the electrification of its suburban lines round London; if so, what lines it proposed to electrify, when it proposed to start, and how long it would take to complete the work; and whether he had received any similar assurance from the London, Midland and Scottish Railway Co. that it would extend its suburban electrification.

Lieut.-Col. Headlam, who replied, said that both the L.N.E.R. and L.M.S. companies had informed the Minister that certain schemes of London suburban electrification were in an advanced stage of technical preparation and, in the event of the London Transport Bill becoming law, would be ready for immediate submission to the Standing Joint Committee of the Transport Boards and the railway companies which the Bill proposed to set up. Consultations were proceeding between the managements and technical officers of the different undertakings concerned with a view to the necessary co-ordination of their proposals. Both the railway companies had made it clear that in the absence of the contemplated co-ordination of London passenger transport and of the cessation of wasteful competition they would not be in a position to embark on heavy new expenditure for such purposes.

The Fuel Research Board's Report

THE annual report of the Fuel Research Board for the year ended March 31st, 1932, has been issued by the Department of Scientific and Industrial Research (H.M. Stationery Office, 2s.).

An experimental brick retort for the low-temperature carbonisation of coal has been working steadily at the Fuel Research Station since November, 1930, and the settings of two brick retorts of the latest design and of two intermittent vertical chamber ovens are being erected. The excellent results obtained have led to the abandonment of experiments in cast-iron retorts.

Using a medium caking coal—"Dalton Main"—a throughput of ten tons per day has been maintained with the brick retorts, giving a yield of coke containing approximately 9 per cent. of volatile matter, and suitable for use as a domestic fuel in open grates.

The brick retort will produce a satisfactory lump smokeless fuel from slacks—caking and non-caking—of low ash content; some were washed at the station before use and were blended. Throughputs of up to six tons per day were attained.

Tars, produced at temperatures below about 800 deg. C., can be converted in the laboratory to excellent motor spirit and Diesel oil, with the entire elimination of pitch.

The Production of Oils

An oil which behaves like a good lubricating oil, has been produced by the action of aluminium chloride on certain substances obtained from light oils. The suggestion that a lubricating oil could be obtained by blending a partially hydrogenated tar oil with another oil, not having lubricating properties is being followed up.

Tests carried out on samples of motor spirit prepared by hydrogenating coal and low-temperature tars indicate that the samples have considerably higher anti-knock values than that of the petrols at present marketed in this country, but their low initial volatility may cause starting troubles. This fuel should be valuable as a blending material for increasing the anti-knock value of other fuels.

The hydrogenation of coal is effected by subjecting it to a temperature of about 450 deg. C. in an atmosphere of hydrogen at a pressure of some 200 atmospheres. An appreciable proportion of the motor spirit used in this country could be made from coal, but the cost of production would be considerably above the present prices of petroleum products imported from abroad.

Pulverised Fuel

Successful results have been obtained with a pulverised-fuel burner so constructed that a mixture of primary air and fuel issues through a grid in a series of thin layers, between which are supplied layers of secondary air, preferably preheated.

A complete departure from existing methods of burning powdered coal is made in the "vortex" combustion chamber under development at the Fuel Research Station, in which an attempt is made, for the first time, to control the motion of both the fuel particles and the air required for their combustion, in order to obtain the relative motion requisite for rapid combustion in a small space. It is hoped by this means to deal with fuel of a coarser nature than that usually required for powdered fuel firing.

The Department of Scientific and Industrial Research has also issued a technical paper, No. 35, on "Low-temperature Carbonisation" (H.M. Stationery Office, 6d.).

The technical paper contains a description of the latest setting of two brick retorts, which cost approximately £1,500, including the foundations and finishing at the collecting mains, but without any accessories such as gas mains, motive power, condensers, etc.

With metal retorts it is necessary, in order to get a good commercial throughput, to keep the temperature of the retort within a few degrees of the destruction limit, but with the brick retorts this difficulty does not arise. Instead of sending away flue gases from the top of the retort at a temperature of anything up to 1,100 deg. C., the gases finally pass away from the bottom at a temperature of 600 deg. C. The secret of the success of the retorts appears to lie in the very high heat input in the first few feet of the retort.

Dr. F. S. Sinnatt (Director of Fuel Research) claims that the retort is cheap in capital cost, easy to work, and gives good yields of products of satisfactory quality with low cost of labour and without unpleasant fumes.

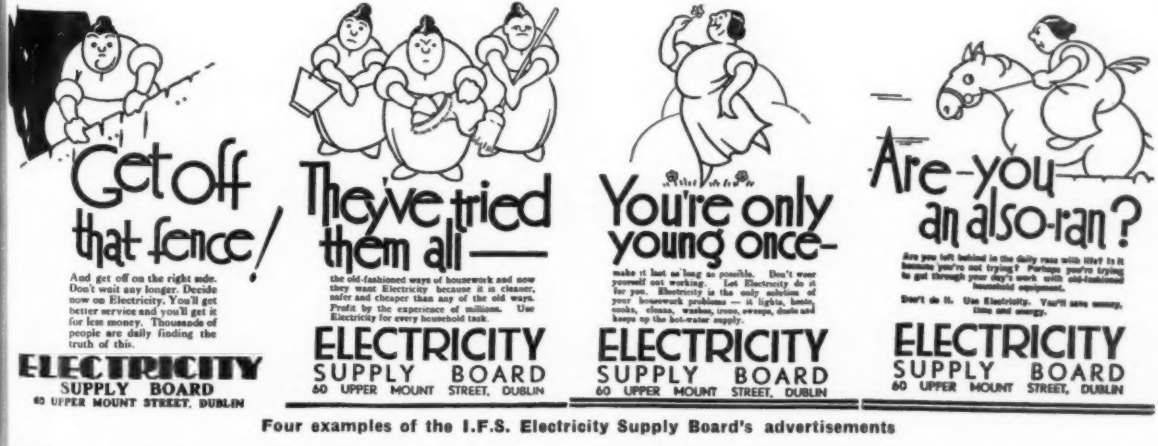
Irish Electrical Publicity

THE publicity material issued by the Irish Free State Electricity Supply Board is produced with a keen appreciation of the public's point of view. The Press advertisements, in particular, have a human appeal and "get across" the advantages of electricity and domestic appliances quickly without a waste of words. They are well connected up with the activities of the showrooms where the electric cooking demonstrations have drawn big attendances at suitable times announced in the Press well in advance. Electric fire advertisements with captions "Begin the Day Warm," "Carry the Comfort with You—upstairs, downstairs, anywhere——," and "You can have it Both Ways," that is to say the advantages of electric fires with the appearance of a coal one, all seem to strike the right note. A series emphasising the availability of fires to harmonise with the colour schemes of any rooms and suggesting that the touch of colour that a fire can give will brighten up a room is good publicity.

"Three units of Electricity cooked this Dinner" will at any rate make the housewife want to read on, and "No empty socket! that's good—but have you any lamps in re-serve?" should jog the memory of someone. The Board seems to use to the full the changing seasons. An advertisement depicting an attractive demonstrator invited the public to attend Christmas cooking demonstrations, and 1933 was heralded with "Something New for the New Year."

Costs of appliances and current consumption are given when it is required, and hiring arrangements are not lost sight of. It is not, of course, suggested that all these lines of approach would be suitable in this country, and many of the themes may have been worked very hard over here already, but the advertisements almost invariably attract attention and have a message.

Amongst booklets and pamphlets distributed by the Dublin Board it is interesting to find the attractive booklet published by the British Electrical Development Association on "The House you Want," and dealing with every electrical requirement of the home room by room. In addition to the Dublin showrooms the Board also has branch showrooms at Limerick, Waterford, Kilkenny, Wexford, Port Laoighise, Clones, Athlone, Tralee, Sligo, Drogheda, Galway and Cork.


Get off that fence!
And get off on the right side. Don't wait any longer. Decide now on Electricity. You'll get better service and you'll get it for less money. Thousands of people are daily finding the truth of this.
ELECTRICITY SUPPLY BOARD
40 UPPER MOUNT STREET, DUBLIN
They've tried them all——
the old-fashioned ways of housework and now they want Electricity because it is cleaner, safer and cheaper than any of the old ways. Profit by the experience of millions. Use Electricity for every household task.
ELECTRICITY SUPPLY BOARD
60 UPPER MOUNT STREET, DUBLIN
You're only young once—
make it last as long as possible. Don't wear yourself out working. Let Electricity do it for you. Electricity is the only solution of your housework problems — it lights, heats, cooks, cleans, washes, irons, sweeps, dusts and keeps up the hot-water supply.
ELECTRICITY SUPPLY BOARD
60 UPPER MOUNT STREET, DUBLIN
Are-you an also-ran?
Are you left behind in the daily race with life? Is it because you're not trying? Perhaps you're trying to get through your day's work with old-fashioned household equipment.
Don't do it. Use Electricity. You'll save money, time and energy.
ELECTRICITY SUPPLY BOARD
60 UPPER MOUNT STREET, DUBLIN

Four examples of the I.F.S. Electricity Supply Board's advertisements

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

Ealing Municipal Trading Protest

A deputation from the Ealing Chamber of Commerce recently attended a meeting of the Corporation Electricity Committee at which it stated that it had observed that the Corporation, by means of the new electricity showroom, was competing with local electrical contractors in the sale of electrical fittings. While it was realised that with all facilities and financial resources behind it the Corporation was better able to let out electrical apparatus on hire and hire-purchase terms, to which the contractors desired to raise no objection, the deputation protested against the cash sale of electrical fittings and apparatus by the Corporation. It was decided to appoint a sub-committee to discuss the matter with representatives of the Chamber of Commerce.

A Topical Birmingham Window Display

The accompanying illustration shows a display of electric fires at the Birmingham Electric Supply Department's showrooms in Paradise Street, Birmingham, to which an original touch has been given. The window has been arranged to

An electrical "Test match" at Birmingham

represent a cricket match, while the card in the background includes terms which have been frequently used in connection with the series of Test matches now being played in Australia.

At the Brighter Homes Exhibition, which is being held in Bingley Hall, Birmingham, the Department has a large stand on which it is displaying a comprehensive range of domestic appliances.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable-making Industry informs us that the February cost of living figure (41 per cent. above the 1914 level) will not involve any alteration in wages on the third pay day in March.

Another Swansea Contract

The Swansea Electricity Committee has accepted the tender of Messrs. Vickers-Armstrong, Ltd., for the condensing plant in connection with the new power station. A report from Messrs. Preece, Cardew & Rider, to whom fourteen tenders had been submitted stated that the prices ranged from £36,156 to £28,850, and they recommended that Messrs. Vickers-Armstrong's tender at £28,850 be accepted. It was decided that inquiries be made as to the amount of work that might be placed locally under the contract though there were no conditions attached to it.

New Swiss Companies

Among the concerns recently organised in Switzerland are the Electro Monopol Gesellschaft, Lucerne (39 Zahringerstrasse) to manufacture neon lighting equipment, and the Gluhlampen Gesellschaft für Uebersee, Schaffhausen (10 Herrenacker).

A Switchgear Exhibition

Mining and other engineers are invited to attend an exhibition of switchgear now being held at the Stennard Works of British Jeffrey-Diamond, Ltd., Wakefield. The display is intended to show the full complement of B.J.-D. mining-type switchgear, ranging from small universal starting switches, as employed on gate end loaders, jigging conveyers, &c., to the 100-A airbreak circuit breakers. Multiple unit switchboards comprising several circuit breakers built up in line also form part of the extensive range of controllers. They are specially adapted for the control of a number of coal face units or even a whole district from one central point. The various interlocking, flameproof, and waterproof features are specially demonstrated to show the utility of the gear for pit work.

Trade Marks Committee

The Trade Marks Committee under the chairmanship of the Rt. Hon. Viscount Goschen has begun its investigations. Persons and associations who wish to submit suggestions or to give evidence before the Committee are invited to communicate with the secretary, Mr. R. W. Luce, Industrial Property Department, Board of Trade, 25, Southampton Buildings, W.C.2. The Committee was appointed by the Board of Trade to report whether any, and if so what, changes in the existing law and practice relating to trade marks are desirable.

Electrical Machinery Exports in January

The following statistics relate to electrical machinery exported from this country during January, notes of increases or decreases being made as compared with the corresponding month of last year :—

	Quantities.		Values.	
	Jan., 1933. Tons.	Inc. or dec. as compared with Jan., 1932. Tons.	Jan., 1933. £	Inc. or dec. as compared with Jan., 1932. £
European countries	179	– 292	39,868	– 38,169
Japan	—	– 10	338	– 2,445
South American countries	46	– 37	7,933	– 15,655
South and South-West Africa	201	+ 89	29,499	+ 11,398
British India	212	– 359	30,534	– 34,019
Australia	58	– 46	9,480	– 5,528
New Zealand	20	– 50	5,425	– 6,595
Canada	18	– 81	4,152	– 11,307
Other countries	161	– 39	24,269	– 11,209
Total	895	– 825	£151,498	– £113,529

Our usual monthly table referring to the United Kingdom's overseas electrical trade generally appears below.

British Overseas Electrical Trade in January

	Exports.			Imports.			Re-exports.		
	Electrical exports for Jan., 1933.	Inc. or dec. as compared with Dec., 1932.	Inc. or dec. as compared with Jan., 1932.	Electrical imports for Jan., 1933.	Inc. or dec. as compared with Dec., 1932.	Inc. or dec. as compared with Jan., 1932.	Electrical re-exports for Jan., 1933.	Inc. or dec. as compared with Dec., 1932.	Inc. or dec. as compared with Jan., 1932.
Insulated wires and cables ...	£99,115	+ £19,795	– £2,788	£18,073	– £7,391	– £21,380	£260	+ £73	+ £200
Electric carbons ...	1,762	+ 1,098	+ 927	14,691	+ 5,597	+ 2,257	12	+ 12	– 127
Arc lamps and searchlights ...	172	– 260	– 1,206	305	+ 305	+ 112	28	+ 28	– 71
Incandescent lamps ...	32,288	– 3,085	+ 3,792	16,787	– 4,706	+ 8,790	1,413	+ 521	+ 701
Other lighting apparatus ...	22,521	– 7,547	– 5,874	19,427	– 11,955	+ 3,524	3,563	– 450	+ 2,351
Batteries and accumulators ...	60,654	– 7,529	+ 4,805	1,680	– 2,172	– 14,255	223	+ 42	– 105
Meters and instruments ...	18,399	– 1,703	+ 8	26,020	– 1,392	– 10,376	123	– 792	– 236
Unenumerated electrical goods and apparatus	71,882	– 5,022	– 5,755	33,145	– 19,262	– 19,934	4,351	+ 1,573	– 39
Telegraph and Telephone Cable and Material—									
Telegraph and telephone wires and cables (not submarine) .	14,863	+ 995	+ 2,904	95	– 556	– 619	—	– 12	– 74
Submarine telegraph and telephone cables .	4,203	– 5,547	+ 3,649	—	—	—	—	—	—
Telegraph and telephone apparatus	245,386	+ 32,889	+ 127,469	46,320	– 23,275	– 12,733	9,374	+ 2,511	+ 4,976
Electrical Machinery—									
Railway and other motors ...	114	+ 91	– 939	—	—	—	—	—	—
Other motors and generators .	60,156	– 36,265	+ 1,110	—	—	—	—	—	—
Unenumerated electrical machinery	91,228	– 148,131	– 113,700	16,221	– 31,043	– 41,114	4,395	– 2,625	– 3,508
Total	£722,743	– £160,221	+ £14,402	£192,764	– £95,850	– £105,728	£23,742	+ £881	+ £4,064

Compensation for Displaced Employés

On Tuesday Lt.-Col. C. M. Headlam, M.P., Parliamentary Secretary to the Ministry of Transport, received a deputation representing the General Council of the Trades Union Congress and representatives of unions interested in the electricity supply industry. Mr. A. G. Walkden, chairman of the General Council, introduced the deputation. The deputation urged the necessity for a measure amending the compensation provisions of Section 16 of the Electricity (Supply) Act, 1919, in consequence of the decision of the High Court in connection with the claim for compensation against Leicester Corporation. Colonel Headlam suggested that the unions concerned should consider the possibility of securing an agreed measure to give effect to their representations.

The Portuguese Radio Market

Unsuitability of design, appearance and price are given in a Department of Overseas Trade report as the main reasons for the almost complete failure of United Kingdom manufacturers to secure a share in the Portuguese radio set market. In most cases British radio accessories and components are fairly well introduced, and with capable agents and some slight reductions in price where necessary, it is almost certain that a considerably larger share of the market would fall to them.

The Association of Ex-Siemens' Men

A smoking concert is to be held at Gatti's Restaurant, King William Street, Strand, W.C.2, on March 10th. Guests will be welcome. Mr. J. Snow Huddleston, hon. secretary, Dagenham Dock, Essex, will be pleased to send particulars of the Association to any qualified for membership.

The City of Birmingham Handbook

Visitors to the Castle Bromwich Section of the British Industries Fair will find much to interest them in the "Handbook for 1933" published by the City of Birmingham Information Bureau. In its 284 pages, besides an illustrated review of the city's notable buildings, historical features, &c., there is a detailed description of Birmingham's many and varied industries and the scope for further development.

Ceylon Customs Tariff Modifications

A resolution of the Council of State which came into operation on February 1st, provides for the levy of preferential duties on certain goods. According to the *Board of Trade Journal* these include electric accumulators (except splash-proof accumulators for motor vehicles, and dry cells), alternators, batteries, convertors, dynamos, exciters, generators, motors, transformers, control and switchgear, on which the preferential tariff is 10 per cent., *ad valorem*, and the general tariff 20 per cent. *ad valorem*, dry cell batteries (preferential and general tariff 15 per cent., *ad valorem*), and wireless goods and apparatus and other electrical goods and apparatus not elsewhere enumerated (preferential, 15 per cent., *ad valorem*; general, 25 per cent., *ad valorem*).

The Builder and the Electrical Contractor

Speaking at the annual dinner and dance of the Manchester Branch of the Electrical Contractors' Association held at the Grand Hotel, Manchester, on February 16th, Mr. W. B. Williams, president of the E.C.A., said that builders might render great assistance to the electrical contracting industry and to the electricity supply industry in general by providing more all-electric demonstration houses. Mr. John Walsh was in the chair.

Mr. J. Harcourt Williams, in submitting the toast of the "Electrical Contractors' Association," expressed the hope that it would continue to increase its membership and field of activity, because by so doing it would be assisting the demand for electricity. The officials of the Corporation recognised in the electrical contractors so many potential salesmen. There was no reason whatever why the contractors and the supply undertaking should not work in the closest possible harmony. If there were a strong representation of members of the E.C.A. on the Register it would be to the advantage of everyone. Salesmen were apt to neglect the existing consumer. The first sale should be a big step in the direction of creating goodwill. After that subsequent business should not be difficult to influence. There were many builders who were not electrically minded, and it was one of their tasks to get them on the side of the electrical industry. Since March 31st, 1932, to the end of January the Manchester Corporation had connected 10,000 new consumers, bringing the total to 86,358, and, at the same time, 1,000 assisted wiring jobs had been carried out, in addition to 1,600 with prepayment meters. The number of hired cookers on circuit was 11,000.

Mr. W. B. Williams said that co-operation inside the different sections of the industry was not sufficient. There should be co-operation on a broader scale, embracing all sections. In his own town much good had been done by the building contractors opening for exhibition purposes a number of all-electric houses.

The object of the gathering, said Mr. W. D. Watson, was to unify the four sections of the trade, the contractor, factor, manufacturer and supply authority. They were mutually interdependent. Mr. John Chambers, president of the Manchester, Salford and District Building Trades Employers' Association, and Mr. A. T. Barratt also spoke, and a whist drive and dance followed the speeches.

The "Queen of Bermuda"

Messrs. Callender's Cable & Construction Co., Ltd., supplied the whole of the electric cables for the hull equipment of the *Queen of Bermuda* (see last issue, page 239), working in conjunction with the Sunderland Forge & Engineering Co., Ltd., which carried out the installations. Approximately 150 miles of cable were used for this purpose, which ranged from single conductor up to twelve conductor, being principally lead-alloy sheathed and fire-proof braided, specially designed to resist high temperature and to possess fire-resisting qualities.

Demonstrator Training at Abertillery

Arrangements are being made by the Abertillery Urban District Council Electricity Department to train young ladies as demonstrators in its electricity showrooms. On the completion of the training course the trainee will be expected to pass the Electrical Association for Women's Certificate, or an equivalent examination.

The British Industries Fair

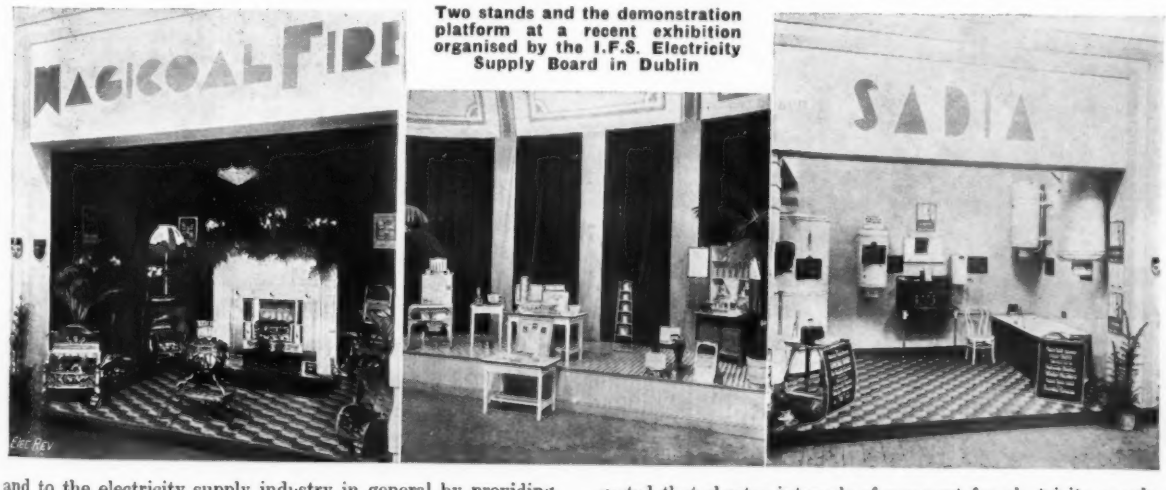
By a printer's error the name of M. & C. Switchgear, Ltd., was given as H. & C. Switchgear, Ltd., on page 227 of our last issue.

The Bradford Contractors' Dinner

The renewal of power plant as a contribution to the relief of unemployment was suggested by the Lord Mayor of Bradford (Alderman J. W. Longley) in a speech at the annual dinner of the Bradford branch of the Electrical Contractors' Association on February 17th. He was proposing the toast of the Association, and he referred to the question of price regulation which, he said, was perfectly good up to a point. If it was carried too far, however, not only prospective buyers but also manufacturers would be against them. The president of the Association (Mr. W. B. Williams), responding, said the Association's policy was not to keep up prices but to obtain a fair and reasonable profit for its members.

Mr. H. Moss, who proposed the health of the guests, suggested that shorter intervals of payment for electricity supply would be more convenient for working-class consumers. Similarly, payment of the cost of installing electricity could be more easily met by payment at shorter intervals.

Principal H. Richardson (Bradford Technical College) and Mr. G. Mountain replied. Other guests included Mr. T. Roles (Bradford city electrical engineer), Mr. P. Collinson, past-president of the Association, and Mr. W. Robb, chairman of the West Yorkshire Branch.



Two stands and the demonstration platform at a recent exhibition organised by the I.F.S. Electricity Supply Board in Dublin

Employment During January

According to the *Ministry of Labour Gazette*, employment in the engineering industry during January showed a decline in all sections as compared with December, the number of

those out of work increasing from 261,125 to 269,267 and the percentage from 26.7 to 27.6. In the electrical engineering section there was a rise from 15,418 to 17,459 in the number unemployed, the percentage being 18.6 as against 16.4. There were also increases in those out of work in the electric cable, wire and lamp manufacturing group from 15,008 to 19,214 (from 12.8 to 16.4 per cent.), and in the electrical wiring and contracting industry from 4,279 to 4,687 (from 17.1 to 18.7 per cent.).

Trade Announcements

The Birmingham branch of Messrs. W. T. Henley's Telegraph Works, Co., Ltd., is to move to-morrow to "Empire House," 158-159, Great Charles Street, Birmingham. (Telephone: Central 3774 and 3775.)

Mr. Clifford E. Sanders, 26, Edward Terrace, Cardiff, has been appointed representative in South Wales for Messrs. William Sanders & Co., Falcon Electrical Works, Wednesbury.

Messrs. James Gordon & Co., Ltd., have appointed Messrs. Tom Smith & Clarke, Ltd., Castle Buildings, Swansea, as their district representatives in South Wales.

Distribution

That it does not pay to cut prices of distribution equipment if this is done at the expense of quality is the moral to be drawn from a series of advertisements now being published by W. T. Henley's Telegraph Works Co., Ltd.

The E.D.A. March Programme

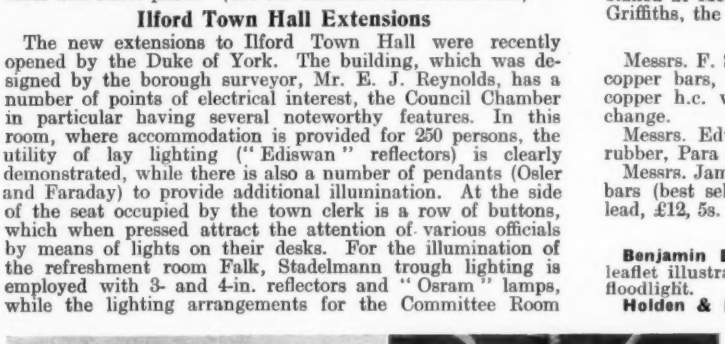
The sales and publicity programme of the British Electrical Development Association for March illustrates the suggested window display for the month, which emphasises the electric cooking idea, and is designed to establish the claim of electric cooking to automatic control. Illustrations of four E.D.A. posters and of seasonal local advertisements are also included. The price list of literature covers cooking, water heating and spring cleaning.

For Sale

North-West Midlands J.E.A. has for disposal a turbo-alternator and boiler plant. (See our classified advertisements.)

Ilford Town Hall Extensions

The new extensions to Ilford Town Hall were recently opened by the Duke of York. The building, which was designed by the borough surveyor, Mr. E. J. Reynolds, has a number of points of electrical interest, the Council Chamber in particular having several noteworthy features. In this room, where accommodation is provided for 250 persons, the utility of lay lighting ("Ediswan" reflectors) is clearly demonstrated, while there is also a number of pendants (Osler and Faraday) to provide additional illumination. At the side of the seat occupied by the town clerk is a row of buttons, which when pressed attract the attention of various officials by means of lights on their desks. For the illumination of the refreshment room Falk, Stadelmann trough lighting is employed with 3- and 4-in. reflectors and "Osram" lamps, while the lighting arrangements for the Committee Room and corridors are carried out with fittings supplied respectively by the General Electric Co., Ltd., and Messrs. Osler and Faraday, Ltd. Nearly fifty "Synchronome" electric clocks are in use. The electrical installation work was undertaken by Messrs. Anderson, Angell & Co., to the specifications of Mr. G. F. Gregory, the borough electrical engineer, who, in co-operation with the manufacturers, was also responsible for the design of the lighting fittings. Illustrations of the new building appear on page 273.



Two attractive displays of "Creda" electric cookers and fires

Social Events

As is customary the electrical staff of the Yorkshire Traction Co. devised several novel effects at the annual staff dance at Barnsley last week, at which there were over 300 guests. Over the bandstand was a figure of Pan with streamers drawing the merrymakers to his piping, an electrical indicator announced the dances, and an illuminated star twinkled from the roof, while the registered design of the company was electrically represented. The work was carried out under the leadership of Mr. F. V. Frith, the company's chief electrician.

The employés of the Igranic Electric Co., Ltd., held their annual carnival dance at Bedford on February 17th, those present including the chairman and directors of the company, the senior executives and a large and representative gathering from the London and branch offices. A number of prizes for the best fancy dress costumes were presented by Mrs. L. M. Paterson, wife of one of the directors.

On February 16th the second annual dinner of the S.W.P. Area Circle of Authorised Electrical Contractors was held at the Grand Hotel, Cardiff. The Circle is an organisation of qualified electrical contractors who operate in conjunction with the South Wales Electric Power Co. Mr. J. T. H. Legge, managing director, S.W.S. & S.W.P. Cos. and president of the Circle, presided. He was supported by Mr. C. T. Allan, S.W.P. Co., Messrs. L. Howles, G. W. Abbott, E. E. Hamar, C. C. MacLeod, W. G. Richards and others. Messrs. F. Madge, R. L. Booth, T. E. Alger, F. H. Jennings and T. R. Priest were among the principal contractors. Mr. A. Bennett, of the United Dominions Trust, proposed "The Circle," and Mr. T. E. Alger, of Newport, who responded, said that as contractors they greatly appreciated the work that had been put in their hands by the power companies. It had been the means of keeping their staffs employed during a difficult period. Mr. Booth proposed "Our President," and Mr. Legge, in responding, said the South Wales Power Co. had endeavoured to do all it could; the business done during the last two years was satisfactory but he believed there was a prospect of doubling and even trebling it. Mr. W. G. Richards, the Circle secretary, was presented with a pewter coffee service.

Recent Contracts

The Cambridge Instrument Co., Ltd., has recently received an order from the Admiralty for twenty-four Cambridge recording and indicating electrical CO_2 meters to be installed in the Royal Naval Cordite Factory at Holton Heath.

Following on the recent installation of a large "Keepalite" system in their new store at Leeds, Messrs. Lewis's have now placed a contract with the Chloride Electrical Storage Co., Ltd., for a similar installation at their Glasgow store.

It is interesting to note that the same system is being installed at Messrs Selfridges in London by Messrs. Higgins & Griffiths, the electrical contractors.

Prices of Materials

Messrs. F. Smith & Co. report, February 22nd: Electrolytic copper bars, sheets and wire rods, no change. Electrolytic copper h.c. wire, 6¼d., ⅛d. dec. Silicium bronze wire, no change.

Messrs. Edward Till & Co. report, February 22nd: India-rubber, Para fine, 4¼d., ¼d. dec.

Messrs. James & Shakespeare report, February 22nd: Copper bars (best selected), sheet and rod, no change. English pig lead, £12, 5s. inc.

New Catalogues and Lists

Benjamin Electric, Ltd., Tariff Road, Tottenham, N.17.—A leaflet illustrating and describing the use of the "Duoflux" floodlight.

Holden & Brooke, Ltd., Sirius Works, West Gorton, Manchester.—A 28-page illustrated catalogue of multi-stage centrifugal pumps.

Electroway Heaters, Ltd., Baxter Gate, Loughborough.—Leaflet A.3, dealing with tubular heaters.

Venner Time Switches, Ltd., Kingston By-pass Road, New Malden.—A circular advertising synchronous motors.

Switchgear & Cowans, Ltd., Old Trafford, Manchester.—A leaflet on medium rupturing capacity metal-clad compound filled internal isolation switchgear.

Central Wholesale Electrical Co., Ltd., 234, Upper Thames Street, E.C.4.—A complete price list of cables and wiring accessories, &c.

Geo. Bray & Co., Ltd., Leeds.—Catalogue C-18, dealing with "Chromolox" immersion heaters.

British Insulated Cables, Ltd., Prescot, Lancs.—Leaflet No. P.F.106, describing the B.I. iron-clad service cut-outs.

Alliance Wholesale, Ltd., 62, Great Russell Street, W.C.1.—A leaflet on "Soapstone" radiators.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—Folder No. O.S.6411, giving particulars of the "Osram" "turndown" two-filament lamp.

Ateliers de Constructions Electriques de Charleroi, 56, Victoria Street, S.W.1.—The February price list of motors, transformers, &c.

Philips Lamps, Ltd., 145, Charing Cross Road, W.C.2.—The February issue of the "Philips News" containing details of the "Photoflux" lamp for photographic purposes.

British Thomson-Houston Co., Ltd., Rugby.—A special publication (No. A.G. 442) relating to the company's exhibits at the British Industries Fair.

E. P. Allam & Co., Ltd., 107-109, Gray's Inn Road, W.C.1.—Stock list (No. 52) of electric motors.

Liverpool Electric Cable Co., Ltd., Linacre Lane, Bootle, Liverpool.—A 36-page brochure describing, with copious illustrations, the company's paper insulated cables.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, E.C.1.—Pamphlet No. W.L.H., drawing attention to the new outdoor "Isco."

Engineering & Lighting Equipment Co., Ltd., Sphere Works, St. Albans.—A 72-page catalogue of street and industrial lighting fittings.

Mirrless Watson Co., Ltd., Scotland Street, Glasgow.—Pamphlet No. P.1067 showing the company's latest range of small general service centrifugal pumps.

Bankruptcy Proceedings

G. D. Whitham, electrical engineer, 86, Orford Lane, Warrington, Lancs.—A receiving order was made recently on the debtor's own petition, and the statement of affairs filed shows liabilities of £1,098, and assets of £501, or a deficiency of £597. The position is attributed to under-estimating on contracts; unwise purchases of shop stock when prices were high; giving excessive credit, and losses on second-hand wireless sets taken in part exchange. The debtor has been aware of his position for the last seven months, two executions have been paid out, and in January last two further executions were levied, the Sheriff being in possession when the receiving order was made. At the first meeting of creditors, held recently, Mr. Parkin S. Booth, 2, Bixteth Street, Liverpool, was appointed trustee, with a committee of inspection. The following are the principal creditors: Baxendale & Co., Ltd., £155; Beacon Electrical Co., £96; General Electric Co., Ltd., £150; Lee & Swindells, £83; Macintosh Cable Co., Ltd., £148; Nutter, Son & Edge, Ltd., £57; Provincial Incandescent Fittings Co., Ltd., £81; Wholesale Fittings Co., Ltd., £96.

R. T. Styles (trading as Styles Radio), radio dealer, 132, Somers Road, Southsea, Hants.—The public examination was held recently at the Court House, St. Thomas's Street, Portsmouth, when the statement of affairs showed liabilities of £1,344, and assets of £198. The position was attributed to lack of capital, bad debts, and heavy business expenses. A private meeting of creditors was held last November when it was decided that unless the debtor could produce £600 in cash or suitable guarantees within seven days, he should file his petition. The examination was adjourned.

V. F. Maddox, wireless and electrical engineer, 6, Homend Street, Ledbury, Herefordshire.—The adjourned examination was held recently at the Shirehall, Hereford. It was reported that the gross liabilities amounted to £217, and the assets were estimated to realise £113. Debtor said that he had failed on a previous occasion, but had not obtained his discharge from those proceedings. He had, however, explained that fact to his creditors when dealing with them. The hearing was further adjourned.

E. S. N. Rees (trading as S. N. Rees), wireless dealer, 4, High Street, Llanhilleth, Monmouthshire.—This debtor's public examination was held recently at the Town Hall, Tredegar. A statement of affairs was submitted which showed a deficiency of £164. Debtor said the net profit in 1931 was £84, and in the next year £82, but the expenses had been heavy. Latterly creditors had pressed and debtor was forced to file his petition. The examination was adjourned to allow certain accounts to be filed.

W. Overton, electrical and radio manufacturer, 139, Canterbury Street, Gillingham.—Receiving order made February 13th on a creditor's petition. First meeting February 28th at the Official Receiver's office, 280A, High Street, Rochester. Public examination March 13th at the Court House, Eastgate, Rochester.

L. S. Green and **W. H. T. Green** (L. & H. Green), wireless dealers, 162, Great Colmore Street, Birmingham.—First meeting February 27th at 159, Great Charles Street, Birmingham. Public examination March 15th at the Court House, Corporation Street, Birmingham.

H. Bennett, wireless engineer, 9, First Avenue, Wrea Green, near Kirkham, Lancs.—This debtor's public examination was held recently at the Sessions Hall, Preston. The present deficiency was £104, and he attributed his failure to insufficient turnover and profits to meet expenses.

J. Burgess (Burgess Radio Co.), radio dealer, 136, Highland Road, Southsea.—Receiving order made February 13th on debtor's own petition.

G. M. Jacob, wireless dealer, 29, Dimond Street, Pembroke Dock.—Last day for receiving proofs for dividend March 3rd. Trustee, Mr. H. W. Thomas, 4, Queen Street, Carmarthen.

S. L. Holt, electrical and radio engineer, 46, Highland Terrace, Uffculme, Devon.—First and final dividend of 2s. 4½d. in the £, payable February 24th at the Official Receiver's offices, Exeter Bank Chambers, Broadgate, Exeter.

J. E. Ridgway, electrical and radio engineer, Hightown, Congleton.—Public examination March 21st at the Town Hall, Macclesfield.

K. A. Fox, radio and electrical engineer, Acle, Norfolk.—Public examination March 7th at the Shirehall, Norwich.

H. H. Bucklar, electrical contractor, 3, The Arcade, Hitchin.—Last day for receiving proofs for dividend, February 25th. Trustee, Mr. P. F. Keens, 4, Tilehouse Street, Hitchin.

G. A. Laird & D. Hyde (Burbury, Laird & Co.), electrical engineers, 6, Warwick Row, Coventry.—First and final dividend of 2s. 11½d. in the £, payable February 17th at 2, Stoneleigh Terrace, Coventry.

F. B. Jewkes (Jewkes Radio & Battery Service), radio engineer, 5, High Street, Wordsley.—First and final dividend of 3s. 10½d. in the £, payable February 21st, at 1, Priory Street, Dudley.

S. A. Sears, radio engineer, 98, High Street, Redbourn, Herts.—Public examination March 15th at the Court House, St. Albans.

S. J. Garrod, electrical engineer, trading as Electrical Repair & Mfg. Co., 181, St. John Street, E.C.1, and as the Garwood Mfg. Co., 34, Clerkenwell Close, E.C.1.—Trustee, Mr. W. A. J. Osborne, 119, Finsbury Pavement, E.C.2, appointed January 31st.

S. H. Lucas, electrical and radio engineer, 52, Commercial Road, Totton.—First and final dividend of 1s. 11d. in the £, payable February 27th at the Official Receiver's Office, Midland Bank Chambers, High Street, Southampton.

H. Snape, wireless dealer, 8, Cook Street Terrace, Wednesbury.—Receiving order made February 8th on a creditor's petition.

A. C. Clewley (Radioland), electrical goods factor, 21, Portland Street, Walsall.—First and final dividend of 11½d. in the £, payable February 22nd, at 159, Great Charles Street, Birmingham.

Company Liquidations

Edison Bell, Ltd., Glengall Road, Peckham, and Huntingdon.—The statutory first meetings of the creditors and shareholders of this company (in liquidation) were held on February 17th at the Holborn Restaurant. Mr. H. P. Naunton, Assistant Official Receiver, reported that the company was registered as a private company in April, 1909, and converted into a public company with a capital of £300,000 (all issued) in May, 1926. It was formed to carry on the business of manufacturers of and dealers in gramophones, records, and electrical appliances. A freehold factory at Huntingdon was purchased in December, 1923, and equipped at a total cost of £12,394 for the manufacture of radio apparatus. Dividends averaging 52 per cent. were paid from 1913 to 1919 and dividends with issues of bonus shares were declared up to 1926; the trading accounts for 1931 and 1932 disclosed losses of £59,423 and £51,255 respectively. In July, 1929, Edibell Sound Film Apparatus, Ltd., was formed to carry out sound recording. That undertaking was not successful and went into voluntary liquidation in September, 1931, owing this company £12,472. The company's bankers in September, 1931, were given charges over its freehold and leasehold properties. In April, 1932, when £45,000 was due to the bankers, Mr. F. S. S. Tull was appointed receiver on behalf of the mortgagees. A draft statement of affairs showed total liabilities of £82,311, of which £44,241 was due to unsecured creditors; the assets were expected to produce £48,769. The deficiency to the contributories was returned at £333,541. The failure of the company was attributed largely to the fact that the wireless branch could not be fully developed; a general falling off in the demand for gramophone records; and to competition by new companies floated in the boom period and since gone into liquidation. There were three nominations for the post of liquidator, and a vote having been taken, the chairman announced that the result would be reported to the Registrar by whom the appointment would be made in due course.

The B.I.F. sign at Olympia at night

Pressland Products, Ltd., radio and electrical engineers, 84, Eden Street, Kingston-on-Thames.—The statutory meeting of creditors was held on February 14th at the Incorporated Accountants' Hall, Victoria Embankment, W.C., when Mr. C. T. Pressland, managing director of the company, presided, and said that at a meeting of the shareholders held previously resolutions had been passed nominating Mr. S. E. Parrish, Cursitor Street, E.C., liquidator of the company. According to a statement of affairs, the liabilities amounted to £5,018, of which £2,530 was due to trade creditors. The total assets were £515, from which had to be deducted preferential claims of £37, leaving net assets of £478, or a deficiency of £4,540. A resolution was passed confirming the voluntary liquidation of the company, with Mr. Parrish as liquidator. The following are the principal creditors: Adie & Co., Ltd., £61; Anglo-Swiss Screw Co., £280; Beaver Electrical Supply Co., £640; Edison Swan Electric Co., Ltd., £197; Hellesens, Ltd., £67; Standard Insulators, Ltd., £100; Trelleborgs Ebonite Works, Ltd., £89; Tungsram Electric Lamp Works, Ltd., £51.

Lectra Ray Products, Ltd.—Creditors' and general meetings March 14th at Messrs. G. M. Chantrey & Co.'s offices, 14-17, Holborn Viaduct, E.C.1, to hear an account of the winding-up of the company by the liquidators, Messrs. G. M. Chantrey and W. E. Wooldridge.

Ross Electric Light & Power Co., Ltd.—Winding-up voluntarily. Liquidator, Mr. J. E. Birchall, Aldwych House, Aldwych, W.C.2.

Eastern Electric Installation Co., Ltd.—Winding-up voluntarily. Liquidator, Mr. W. A. J. Osborne, Balfour House, Finsbury Pavement, E.C.

North East Electric Co., Ltd.—Meeting, March 17th, at 111, Grosvenor Road, S.W., to receive an account of the winding-up by the liquidator, Mr. W. F. Edwards.

Private Arrangement

G. J. Scragg, electrical engineer, Maenon House, Victoria Square, Holywell, Flintshire.—The creditors were called together recently, at the Hotel Victoria, Holywell, when the statement of affairs showed liabilities of £1,370, and assets of £198. The net assets were £191, leaving a deficiency of £639.—A resolution was passed confirming the deed of assignment already executed, whilst a committee was also appointed.

Electricity Supply

Lighting, Domestic, Power

Ammanford.—CHANGE-OVER.—The Electricity Commissioners have given their approval to a scheme for the change-over of the supply system in Ammanford from d.c. to a.c. March 27th has been fixed as the date for commencing the change-over.

Anstruther.—COMPREHENSIVE SUPPLY SCHEME WANTED.—It was reported at a recent meeting of the Town Council that the Fife Electric Power Co. did not want to bear the expense of laying down cables in small sections of the burgh, but preferred to carry out the whole scheme at once. The Council decided to ask the Electricity Committee to go into the matter and find a solution at the earliest opportunity.

Ashford.—SUPPLY DIFFICULTIES.—The Electricity Committee has been pressing the Kent Electric Power Co., Ltd., for the agreement dealing with the bulk supply and expresses concern as to what will be the position next winter unless some immediate progress is made. The electrical engineer has been authorised to make inquiries from one or two manufacturers respecting the supply of a new engine.

Bradford.—FLOODLIGHTING PROPOSAL.—The Bradford Chamber of Trade is appealing to the Electricity Committee to consider the floodlighting of the Wool Exchange, the banks, building societies, insurance companies, and similar buildings which occupy large spaces in main streets. It is suggested that the floodlighting of these buildings would enhance Bradford's shopping attractiveness by eliminating breaks in the lines of shop lights, and that the Corporation would be doing the town a service by supplying cheap electricity for such a purpose.

Brighton.—LINKING-UP SCHEME.—The Electricity Committee is to link up the mains between Patcham and Moulsecoomb at a cost of £6,000.

PROPOSED AUTUMN ILLUMINATIONS.—The electrical engineer has been asked to report on a scheme of autumn illuminations, based as far as possible on those at Blackpool, the estimated cost of which would be about £10,000.

STREET LIGHTING.—It has been decided that the charge for electricity supplied by the Corporation throughout its area (except in the parish of Telscombe) for street lighting purposes shall be 1d. per kWh or such other price as may be charged within the county borough of Brighton, and that in future local authorities requiring street lighting services shall be required to repay to the Corporation the whole cost of those services.

China.—THE YANGTZE HYDRO-ELECTRIC SCHEME.—According to the *Chinese Economic Bulletin*, the proposed Yangtze hydro-electric plant is to be built either at a site four or five *li* east of Ichang or 20 *li* above that city. This alternative selection is the result of investigations made by a group of engineers including Mr. Chao Shu-tse, of the National Reconstruction Commission, Mr. Soong Shi-shang, head of the Public Works Department, and several technicians of the Yangtze Conservancy. Both sites, Mr. Soong announced, are suitable as having a normal flow of water and a good position for industrial development. The proposed station, which will cost $10,000,000, will include a 120,000-kW plant.

Croydon.—PAYMENTS TO CONTRACTORS.—The Electricity Committee reports that during the past twelve months approximately £3,600 has been paid to the local electrical contractors for wiring hired apparatus, the wiring being carried out at the cost of the Department for hirers of cookers, wash boilers and immersion heaters. Schedule prices for this class of wiring have been agreed from time to time between the Department and the Advisory Committee representing the Croydon registered electrical contractors. In view of the increased quantity of work now being carried out, the Committee recommends that tenders be obtained for the work in accordance with the schedule for periods of six or twelve months.

NEW DISTRIBUTORS.—Additional distributors are to be provided at a cost of £4,900.

Dorchester.—SHOP-WINDOW LIGHTING.—The Town Council has decided to extend the scheme for late shop-window lighting, with a charge of £10 per kW of lighting demand, plus a "unit" charge of ½d., a minimum fixed charge of £10 per annum to be paid in advance by quarterly instalments. This will benefit approximately 20 additional shops.

LOAN.—Sanction to a loan of £2,000 for cables and services has been applied for.

Dunblane (Perthshire).—PUBLIC LIGHTING.—The Lighting Committee recommends the substitution of electricity for gas for the public lighting of the town.

Dundee.—THE CAROLINA PORT STATION.—The Central Electricity Board has reconsidered its proposal to close the Carolina Port generating station for eight months in the year. Mr. A. E. McColl, Scottish engineer of the Board, attended a meeting of the special sub-committee of the Corporation dealing with the matter last Friday, and intimated that in view of the representations made to Sir Andrew Duncan and other members of the Board on the occasion of their recent visit to Dundee the Board had given consideration to the position of the city, and had now come to an agreement that the Central Electricity Board would run the power station at Carolina Port for a similar number of hours as in 1932. Lord Provost Buist, in a statement after the meeting, said that this meant that the station would always be under steam, and the one turbine would be running steadily during the ordinary industrial hours. A report on the negotiations between the Board and the Corporation placed before the Electricity Committee on Monday states that places like Dundee, where the cost of generation is already very low, cannot, from the nature of things, expect to benefit immediately from the economies of the grid scheme, but hopes are held out that the benefits will ultimately materialise when outputs increase. The electricity undertaking of Dundee from its inception down to May, 1932, has cost £1,416,724. The outstanding debt, at the same date, amounted to £656,012, of which approximately £329,450 represents the debt on generation, and £326,562 on distribution.

Ealing.—TENDERS TO BE INVITED.—At a recent meeting of the Electricity Committee it was reported that tenders were to be invited for the installation of transformers, switchgear and voltage regulators in 33,000-V and 10,000-V sub-stations.

Edinburgh.—ADVERTISING SIGN DECISION.—The Corporation Streets and Buildings Sub-committee has expressed approval of a proposal to permit the more general use of illuminated electric signs and floodlighting in the city's streets.

Gillingham (Kent).—EXTENSIONS.—The Town Council has applied for sanction to a loan of £6,699 for new 200-V feeders. The generating station switchboard is to be altered at a cost of £1,600, and cables are to be extended along Star Lane at an estimated cost of £400.

Glasgow.—NEW SUB-STATIONS.—The Electricity Committee is to erect sub-stations in Kinbuck Street and in Edzell Street.

Gt. Yarmouth.—ILLUMINATION SCHEMES.—The Pavilion Committee is to carry out a scheme for illuminating and floodlighting the bank enclosure and cliffs at Gorleston at a cost of £435, while the Beach Committee has agreed to spend £300 on floodlighting the bathing pool and other places.

SUPPLY TO KESSINGLAND AREA.—Application is to be made by the Town Council for a Special Order authorising it to extend its area of supply to include the area south of Kessingland.

Herts.—HOSPITAL INSTALLATION.—The County Council Health Committee recommends that the rewiring of the Hill End Mental Hospital should be carried out where necessary, as soon as possible, at an estimated cost of £1,102.

India.—ELECTRICITY FOR KOLHAPUR STATE.—The Kolhapur State Government will shortly undertake the construction of an important hydro-electric scheme which will provide power to operate the several engineering concerns of the State. At Radhanagari there is a large reservoir in the neighbourhood of high mountains, where a head of 1,200 ft. is available. Mr. Latimer, an English hydro-electric expert, is expected to go to Kolhapur at the invitation of the State Government to examine the whole scheme, and the work will be carried out according to his proposals. About 50,000 h.p. will be produced, with the assistance of which it is expected to open aluminium works, the raw material for which abounds in the State. The site is about thirty miles from Kolhapur city.

DEVELOPMENT IN NEPAL.—The Nepal Government has undertaken the construction of hydro-electric plant at Sunderjal about ten miles from Katmandu, designed to supply electricity to newly started mills and factories. Loans are being granted to citizens to start mills and factories for various purposes, and to utilise the hydro-electric power that is being produced. A new telephone scheme is also under construction.

Kirkcaldy.—THE SUPPLY QUESTION.—The Town Council has reiterated its intention not to close its electricity plant in favour of the offer of the Central Electricity Board.

Leslie (Fife).—DUPLICATE SUPPLY.—With regard to breakdowns in the supply of electricity, letters from the Central Electricity Board and Fife Electric Power Co. state they have now decided to provide a duplicate system for supplying the town.

Letham (Forfar).—ELECTRICITY SCHEME.—It has been proposed to make the village of Letham a special lighting area to be supplied by the Grampian Electricity Supply Co., the charge for electricity to be about 5d. per kWh. The streets up till lately were lighted with paraffin lamps.

Lichfield.—EXTENSIONS.—The City Council has decided to extend cables to Yoxall, and to apply for a Fringe Order to enable this extension to be carried out. The electrical engineer is to canvass the districts of Little Hay and Weeford in order to ascertain the probable amount of electricity which would be consumed.

LOANS.—Sanction is being sought to a loan of £7,083 for mains and services, meters, and assisted wiring. The Council has received permission to borrow £1,764 for mains and £350 for sub-station equipment, in connection with the extension of the supply to King's Bromley.

Linlithgow.—ELECTRICITY AND INCREASED VALUATIONS.—At a recent meeting of the Town Council a deputation reported on its interview with the assessor regarding the increase of valuations when electric lighting was introduced. The assessor agreed to a 5 per cent. increase on the cost of introducing electric lighting, *i.e.*, a £20 rental would become £21. If the cost of introducing electric lighting should amount only to £10, the assessor was willing to increase the valuation by only 10s. In the course of the discussion it was stated that the local electricity supply company was taking up the matter because in some districts there was no increased valuation.

Littlehampton.—PURCHASE OF UNDERTAKING.—The Chamber of Commerce has passed a resolution recommending the Urban

District Council either to exercise its option to purchase the electricity undertaking in the near future, or to waive the purchase clause and accept the reductions offered by the supply company.

London.—ISLINGTON.—The Electricity Committee recommends the adoption of a scheme prepared by Messrs. Merz & McLellan for the replacement of the switchgear at the power station at a cost of £105,931.

BATTERSEA.—The Electricity Committee reports that the London Power Co., Ltd., has applied to the Electricity Commissioners for sanction to install a 100,000-kW turbo-alternator in its generating station at Nine Elms, in addition to the two 60,000-kW sets now in course of erection. An agreement had previously been arranged with the company giving the Council protection with regard to three points upon which they might otherwise have been prejudiced, and the Electricity Commissioners in giving sanction to the erection of the station attached certain conditions as to the precautions to be taken in connection therewith. The effect upon the operation of the South-East England Electricity Scheme of the further installation now proposed is under consideration by the London and Home Counties Joint Electricity Authority, and by the Conference of Local Authorities owning electricity undertakings in Greater London, upon both of which bodies the Council is represented.

Sanction has been received to the borrowing of £40,000 for mains and services. Services are to be provided to 141 premises at an estimated cost of £1,210.

ST. PANCRAS.—The Electricity and Public Lighting Committee recommends the provision of h.p. switchgear at the power station at a total cost of £26,933.

It is proposed to introduce a scheme whereby consumers under the small dwellings system may be enabled to acquire from the Council the electrical installations on their premises.

H.p. and l.p. cables are to be extended from Pancras Street to the sub-station at a cost of £1,140, and £2,000 is to be spent on giving an a.c. supply to 4, Henry Street, where a factory is to be set up. Mains extensions costing £2,042 are also to be carried out.

Manchester.—ESTIMATES.—In the estimates of the Electricity Department submitted to the City Council, expenditure amounting to £420,000 is budgeted for on capital account. It is proposed during the coming year to spend £254,000 on mains and services; £42,000 on transforming stations, distributing stations, stores, depôts, &c.; £10,000 on street lighting and £114,000 on generating stations, land, buildings, machinery, &c. Concerning the estimates on revenue account, generating and distributing expenses, including rents, rates, taxes, management and general expenses, are budgeted at £1,280,500 and in addition there is the sum of £615,000 for debt redemption and interest on loans. Sales of electricity and miscellaneous rentals, sales of steam and net profit on sales of apparatus at the electricity showrooms are estimated to produce £1,954,000. Income from the sales of energy will probably be £55,000 more than in the year now concluded. Of the estimated net profit, £59,000 is allocated to capital outlay on meters and short-lived domestic apparatus.

Newport (Mon).—EXTENSIONS.—The Electricity Committee has received sanction to the erection of overhead lines for the supply of electricity to the parishes of Magor, Langstone, Llanmartin and Bettws.

MARKET HALL LIGHTING.—The Markets Committee has asked the borough electrical engineer to prepare a scheme for improving the lighting at the market hall.

Paisley.—LOAN SANCTIONED.—The Electricity Committee has received sanction to the borrowing of £3,967 for domestic apparatus and £4,000 for wiring installations.

Pontardawe.—THE ELECTRICITY SCHEME.—The Craig-cefn-Park section of the Rural District Council's electricity scheme was switched on last Friday. There have been no lighting facilities before and this section of the scheme has cost £4,000.

Prestonpans.—ELECTRICITY OR GAS?—The Town Council is considering whether electricity or gas shall be used for street lighting, and the local electricity and gas companies are being asked to submit terms.

Roumania.—SUPPLY STATISTICS.—The report of the Roumanian Union of Electricity Producers and Distributors shows that at the end of 1931 there were 168 generating stations in Roumania supplying power for public purposes, their total capacity being 204,500 kW. Of the total, 87 stations with a capacity of 25,800 kW generate d.c., three totalling 5,100 kW, single- or two-phase a.c., and 78 of 173,600 kW three-phase a.c. The plant in the 168 stations comprises 65 hydraulic turbines (average capacity 446 kW), 89 steam engines (average 1,220 kW), 283 Diesel engines (average 182 kW), and gas and petrol engines 30 (average 82 kW).

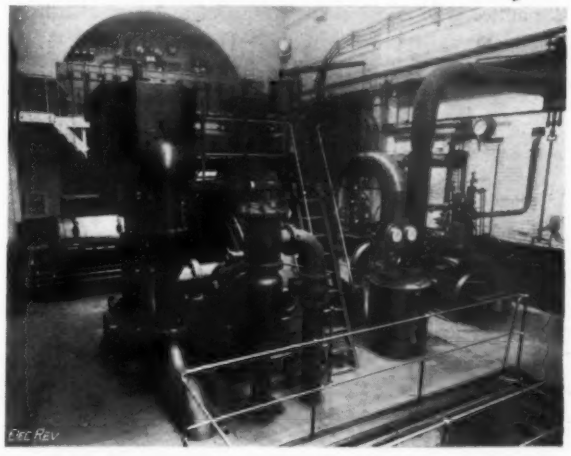
Stockton-on-Tees.—EXTENSIONS.—The Electricity Committee is to provide electricity for the Norton district, and is considering giving a supply to the malleable works of the South Durham Steel & Iron Co., Ltd.

Stoke-on-Trent.—LOAN.—The Corporation Electricity Committee is applying for sanction to borrow £1,350 for additional l.p. feeders for the improvement of supply in the Basford area.

United States.—OUTPUT OF ELECTRICITY.—Electricity produced for public use in the United States totalled 82,939,000,000 kWh in 1932, a decrease of 9½ per cent. as compared with the preceding year. Production by water power was 11 per cent. higher than in 1931 and represented 41 per cent. of the total output in 1932. The average daily output in December, 1932, was about 0.5 per cent. less than in November.

Warrington.—ELECTRICITY FOR HIGH LEGH.—The Town Council has applied for sanction to a loan of £1,350 for the erection of overhead lines to supply electricity to High Legh.

West Hants.—SPECIAL ORDER REVOKED.—The Minister of Transport has revoked the West Hants Electricity (Extension) Special Order, 1930, so far as it relates to that portion of the area of supply which now comprises part of the area of supply authorised under the Mid-Southern Electricity (Extension) Special Order, 1932.



This Ferranti 400-kW alternator set at the Dover Corporation power station is to be scrapped to make room for new equipment for the grid supply. It was built in 1903, and was in continuous service until 1926, since when it has been kept as a standby

Traction

Belgium.—ELECTRIFICATION OF BRUSSELS-ANTWERP LINE.—The question of the electrification of the Brussels-Antwerp line is still under examination by the Société Nationale des Chemins de Fer Belges. In order to ensure the early execution of the plan the Board considers it necessary that the State's share of the cost should be fixed at an early date and that acceptable conditions for the supply of electricity should be obtained. A trial order for a 210-h.p. Diesel railcar has been given, and five other railcars for branch lines are to be ordered in Hungary.—*Reuter's Trade Service.*

Croydon.—TRAFFIC SIGNAL EXPERIMENT.—The Highways Committee reports that it has considered whether any improvement might be effected in the method of operation of the pedestrian-controlled traffic signals installed in the borough and proposes, with the approval of the Ministry of Transport, to dispense with the amber light hitherto used as a signal to pedestrians, and to use only the red and green signs on the "pedestrian" side of the installation.

TRACK RENEWAL.—The Tramways Committee is to renew tracks at stopping places at a cost of £480.

Germany.—DIESEL-ELECTRIC TRACTION.—The "Flying Hamburger" Diesel-electric rail-car has given such satisfaction that the German State Railway Co. has ordered another of the type for maintaining a fast service between Cologne, Essen, and Dortmund, the maximum speed in this case being 62 m.p.h. Three further Diesel-electric rail-cars of 175 h.p. are also being built for use on the Düsseldorf-Krefeld line.

India.—MADRAS.—New rolling stock on the tramways costing about £65,000 is to be provided by the Madras Electric Tramways, Ltd. Thirty-four vehicles are to be replaced.

London.—WANDSWORTH.—Automatic traffic control signals are to be installed in the borough at a cost of £3,205.

Middlesbrough.—OPPOSITION TO TRANSPORT PROPOSALS.—The Stokesley Rural District Council is to oppose the Middlesbrough Corporation Bill, in which powers are sought regarding the transport services in the rural areas.

Nottinghamshire.—TRAFFIC CONTROL.—The Highways Committee recommends the provision of traffic signals at Worksop, Mansfield and Retford at a cost of £1,500.

Paisley.—BUSES OUST TRAMS.—The Town Council has approved a proposal of Glasgow Transport Department to substitute buses for trams on the Abbotsinch route.

South Shields.—TRAMWAY SPEED-UP.—It is understood that the Tramways Committee has approved a scheme for the speeding up of the tramway service by the abolition of a number of stops. A saving of £500 annually is thus expected.

Spain.—RAILWAY ELECTRIFICATION.—A French firm, reports *Reuter's Trade Service* from Madrid, is trying to obtain a

contract from the Spanish Ministry of Public Works for the electrification of the Madrid-Avila-Villalba-Segovia railway line (72 miles). The work would mean employment for about 2,000 men.

United States.—NEW YORK-PHILADELPHIA LINE ELECTRIFIED.—The newly electrified service between New York and Philadelphia was put into public operation last month. For the motive power a.c. at 11,000 V, single phase, 25 cycles, is used, and new locomotives having six motors with a horse power of about 3,400 have been designed for a speed of 90 m.p.h.

Watford.—TRAFFIC SIGNALS.—The Corporation Highways Committee is to install traffic signals at a cost of £1,150.

Wolverhampton.—PENNY FARES.—Penny fares are to be introduced experimentally on the Corporation transport system in April.

Communications

Belgium.—BROADCASTING CONFERENCE.—The work of the International Broadcasting Union Conference is proceeding apace, and the second technical sub-committee, deputed to define the principles upon which a new allotment of wavelengths should be based, has already produced a report. It covers the whole problem of wavelengths and their uses, and is considered extremely important in view of the inter-Governmental wireless conference at Lucerne in May. The first technical sub-committee has also held meetings, and the third sub-committee will draw up actual suggestions based on the findings of the first two. It was thought that the conference might finish on Saturday, as the several countries appear to be reserving their final arguments and suggestions for the Lucerne Conference. All the countries of Europe except Soviet Russia are taking part, as well as Egypt and Morocco.—*Reuter* (Brussels).

The Marconi wireless telephone receiving installation on the new luxury liner *Queen of Bermuda* described in our last issue

Birmingham.—TELEPHONE PROGRESS.—During 1932 exchanges increased by five to twenty-seven and automatic exchanges increased to thirty-five in the Birmingham area (Mr. R. A. Weaver, superintending engineer). Telephones numbered 81,382, the increase of 2,216 being smaller than in the previous year. Provision has been made for 75,000 exchange lines, and two-thirds of the equipment available is already in use. During the year eighty-six call offices were opened, including eleven in rural areas, making 1,147 in all, of which 789 are kiosks. Subscribers' calls totalled 63,300,000, an increase of 2,100,000, including 4,800,000 trunk calls. Phonograms fell slightly to 898,000. Private branch exchanges increased by 82 to 4,027, serving 31,239 telephones. Residential rate instruments increased by 938 to 18,464. In the Birmingham group fifteen new automatic exchanges were opened and six in the Wolverhampton group; also one rural auto-exchange; and 40 per cent. of subscribers in the district are now connected to auto-exchanges. The B.B.C. repeater equipment at Birmingham was largely augmented during the year.

Great Britain.—RADIO RELAY EXCHANGES.—Ealing Highways Committee has been asked by Wembley Relay Services, Ltd., and Mr. R. A. Smart for facilities to install wireless relay services in the borough. The policy of the Council is to disapprove the establishment of services involving the suspension of wires across public highways.

Worcester City Council has referred to the Finance Committee an application to establish a service by the Swindon Radio Exchange, Ltd. Local radio dealers have petitioned the Council not to allow the establishment of a service on the ground that it would be detrimental to their businesses.

Truro Improvement Committee has been informed that Messrs. H. T. P. & Co., Ltd., are unable to quote for the installation of a relay exchange in Truro. Messrs. J. H. Deeble and Sons, Ltd., are to interview the town clerk. Broadcast Listeners Service, Ltd., have already commenced operations in Redruth and Penzance under the name of the Western Broadcast Service, Ltd. The company suggests that the Committee should not make any decision with regard to other companies until the proposals of the Broadcast Listeners Service Co. are received.

Farnham Highways Committee has had offers from certain companies, but recommends that they should not be entertained.

North Wales.—TELEPHONY IN 1932.—In the Chester, North Wales, and Hanley districts the telephones showed a net increase of 2,022, raising the total to 47,146. Exchanges rose by twelve to 374, of which 276 were manual and ninety-eight automatic; the latter increased by twenty-three and now serve 38 per cent. of the subscribers. Eleven new rural auto-exchanges were in course of completion. Provision is now available for 47,100 subscribers and 70 per cent. of the existing equipment is in use. Call office kiosks increased by 84 to 386. Local and junction calls increased by 6 per cent. to 21,425,466, trunk calls totalled 4,372,599, and phonograms decreased slightly to 302,028.

Yorkshire.—TELEPHONE DEVELOPMENT.—The north eastern district (Mr. J. W. Atkinson, superintending engineer) covers about 7,000 sq. miles and during 1932 the number of new "stations" connected was 6,755, the net increase being 1,660, bringing the total to 51,925. Business and residential subscribers numbered 40,822 and 11,103, respectively, while there were 24,963 automatic and 26,962 manual stations. New call offices opened numbered 108, making the total 1,792, of which 515 are kiosks; sixteen new automatic exchanges, of which fourteen were of the rural type, were opened and several were extended. Sixty-two additional trunk and junction lines were provided. Trunk calls originated in the district increased slightly to 4,713,161, while junction and local calls rose to 23,984,400; the number of phonograms was 507,288.

The A.S.E.E. Dinner

THE annual dinner of the Association of Supervising Electrical Enginers was held on February 18th at the Trocadero, W.1, when nearly 250 members and guests sat down under the chairmanship of Mr. G. Scott Ram, the president.

"The Electrical Industry" was proposed by Mr. J. S. Highfield (past-president), who emphasised the importance to the electrical industry of prosperity in others as power consumers. The prosperous supply section should be willing to pay fair prices to manufacturers of plant and to contractors. Prices should not be cut for lighting, and he advocated a lump-sum charge for rural consumers of 1s. 2d. per week for 120 kWh per annum. He rejoiced that the electrical industry had not followed the example of the gas industry, but had encouraged individual contractors.

Responding, Mr. J. M. Kennedy (vice-president, I.E.E.), called for more co-operative effort, particularly in publicity, by providing funds for E.D.A. He submitted that the proportion of the population using electric cookers was still too small. Many supply engineers were not enthusiastic regarding this application, and many villages near London had no electricity. The passage of the Transport Bill should stimulate suburban railway electrification.

Mr. P. V. Hunter (president, National Register of Electrical Installation Contractors), also responding, referred to the technical men (whose employment as "qualifying managers" was necessary to enable a firm to be registered) as the backbone of the contracting industry.

The President, proposing the toast of "Our Guests," named several of those present, who included, apart from the speakers, Messrs. A. C. Cramb (director, E.D.A.), W. Bishop (chairman, C.M.A.), Sir John Brooke (vice-chairman, Electricity Commissioners), Dr. Bridge (Senior Medical Inspector of Factories), Mr. Evershed (hon. solicitor), and five past presidents of the Association, Messrs. A. P. Trotter, J. S. Highfield, W. E. Highfield, A. M. Sillar, and S. B. Donkin. He announced that the presentation of the Highfield Shield had been postponed in order to leave more time for the reunion which was to follow.

Response was made by Sir Murdoch MacDonald, M.P. (president, Inst. C.E.), and by Mr. A. E. L. Chorlton, M.P. (president, I.Mech.E.). Mr. Chorlton urged engineers to combine to form an association to bring mass pressure to bear on the Government with regard to matters that concerned them. The association should hold an annual conference to impress the public. In Great Britain there was a reluctance to accept the trained mind, which did not obtain abroad.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Aberdeen.—February 27th. Royal Mental Hospital. Electric lighting work at new branch hospital. G. Bennet Mitchell & Son, architects, Bon Accord Square, Aberdeen.

Alderley Edge & Wilmslow.—Electricity Board. Electrical stores. (See this issue.)

Australia.—MELBOURNE.—March 7th. Department of Posts and Telegraphs. Telephone handsets. (A.X. 11675.)*
March 21st. Tumbler switches. (A.X. 11676.)* Telephone terminal strips. (A.X. 11677.)* Microphone component parts. (A.X. 11678.)*

Bedford.—February 27th. Electricity Department. Underground cables and lamps. (February 10th.)

Blackburn.—February 27th. Electricity Department. Cable, rubber insulated wire, and meters. (January 20th.)

Cardiff.—March 20th. Electricity Department. E.h.p. and l.p. overhead lines and pole-mounting transformer and switchgear at Peterston-super-Ely. (See this issue.)

Dover.—March 3rd. Electricity Department. Cables. (February 17th.)

Dumfries.—County Council. 33- and 11-kV air break switchgear. (See this issue.)

East Sussex.—March 13th. Public Assistance Committee. Electric lamps for six months for eleven institutions. P.A. Officer, West Street, Lewes (tender forms 1s. per copy).

Edinburgh.—March 9th. Electricity Department. Electrical stores. (February 17th.)

Erith.—March 7th. Electricity Department. Cables, meters, joint-boxes, &c. (See this issue.)

Grays Thurrock.—March 8th. Electricity Department. Installation work in connection with assisted wiring scheme. (See this issue.)

Hastings.—March 7th. Electricity Department. Power station and sub-station switchgear. Also two 3,000-kVA transformers. (See this issue.)

Hayes and Harlington.—February 27th. Urban District Council. Electrically driven sewerage pumping plant. Mr. E. A. Sandford Fawcett, consulting engineer, 53, Victoria Street, S.W.1.

India.—February 28th. Bengal and North Western Railway Co., Ltd. 26,500 tungsten filament lamps. (February 10th.)

Lanark.—February 28th. County Council. Various works, including electric lighting, at 44 houses at Blantyre. Mr. P. C. Smith, county housing and town planning engineer, Hamilton.

Leeds.—March 7th. Electricity Department. Transformers. (February 10th.)

London.—HACKNEY.—March 8th. Electricity Department. Electric meters and demand indicators. Also installation cables and flexible cords. (See this issue.)

Long Eaton.—March 1st. Electricity Department. Cables, coal, service meters, and service cut-outs. (February 10th.)

Manchester.—March 1st. Electricity Department. Electric cookers. (February 17th.)
March 8th. Two 2,000-kVA static transformers for Barton power station. (See this issue.)

Milford Haven.—February 28th. Electricity Department. Goods and materials, including meters. (February 17th.)

Oldham.—March 2nd. Public Assistance Committee. Electric lamps and fittings for Rochdale Road Institution. Public assistance officer.

Portsmouth.—March 3rd. Corporation. General stores. (February 17th.)

Rhondda.—March 25th. Electricity Department. Meters, copper wire, joint boxes, &c. (February 17th.)

Salford.—March 2nd. Electricity Department. General electrical stores. (February 10th.)
March 6th. 6,600-V metal-clad sub-station switchgear and l.p. fuse gear. (See this issue.)

Sevenoaks.—March 15th. Rural District Council. Installation of electricity at Isolation Hospital at Otford. (See this issue.)

South Africa.—JOHANNESBURG.—March 2nd. 6,600-V switchboard cubicles. (A.X. 11692.)*
CAPE TOWN.—March 15th. Metal-clad switch and fuse boards for domestic purposes. (A.X. 11697.)*

Stoke-on-Trent.—March 8th. Electricity Department. A.c. meters, mains and cables, and overhead lines. (See this issue.)

Swansea.—April 1st. Electricity Department. Stores for twelve months. (February 3rd.)

Willesden.—April 1st. Electricity Department. Cables. (See this issue.)

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Ashford.—Urban District Council. Accepted. Transformers. (£4,900).—Crompton Parkinson, Ltd.

Beith (Ayrshire).—District Committee. Accepted. Electric light pendants for the Council room.—P. Geddes.

Derby.—Electricity Committee. Recommended. Evaporator. (£2,097.)—Aiton & Co., Ltd.

Dundee.—Corporation Electricity Department. Accepted. Two negative boosters for the tramway system.—Lancashire Dynamo & Crypto, Ltd.

Ealing.—Highways Committee. Recommended. Traffic signals, Uxbridge Road (£414) and Popes Lane (£334).—Automatic Electric Co., Ltd.

Ely.—Urban District Council. Accepted. Electrical pumping equipment at Isleham Waterworks (£439).—Mather & Platt, Ltd.

Government Contracts.—The following contracts were placed by the various Government departments during January :—

ADMIRALTY (CONTRACT AND PURCHASING DEPARTMENT).
Electric bells.—Bonnella Bros.; Engineering and Lighting Equipment Co.; A. Graham & Co.; Wm. McGeoch & Co.; Phœnix Telephone & Electric Works.
Electric cable.—Connollys; G.E.C.; Hackbridge Cable Co.; Metropolitan Electric Cable & Construction Co.; Siemens Electric Lamps & Supplies.
Cells.—Accumulators of Woking.
Electric smithy crane.—J. Booth & Bros.
Heating elements.—Simplex Electric Co.
Electric lamps.—G.E.C.
Navigation lamps and lanterns.—W. McGeoch & Co.; Eli Griffiths & Sons; W. T. George; Chance Bros.; Bulpitt & Sons.
Portable electric lamps.—Engineering & Lighting Equipment Co.
Electric traveller (3-ton).—J. Adamson & Co.
Tuners, amplifiers and note magnifiers.—Radio Instruments.
Copper wire.—Concordia Electric Wire Co.; Connollys; G.E.C.; L.P.S. Electrical Co.; London Electric Wire Co. & Smiths; Potter & Soar; Ward & Goldstone.

WAR OFFICE.
Generating sets.—R. A. Lister & Co.

CROWN AGENTS FOR THE COLONIES.
Automatic exchange.—Automatic Electric Co.
Interlocking apparatus.—Westinghouse Brake & Saxby Signal Co.
Switchgear.—Allen West & Co.

POST OFFICE.
Telegraphic apparatus.—Plessey Co.
Telephonic apparatus.—Automatic Electric Co.; Ericsson Telephones; Radio Instruments; Telephone Mfg. Co.
Wireless apparatus.—Standard Telephones & Cables.
Cable.—Connollys.
Telephone cords.—L.P.S. Electrical Co.; Phœnix Telephone & Electric Works.
Cable drums.—Pirelli-General Cable Works.
Depolarising Leclanché elements.—Atlas Carbon & Battery Co.; B.I. Cables; Ediswan; Fuller Accumulator Co.; G.E.C.; I.R.G.P. & Telegraph Works Co.; Siemens Bros.
Telephone lamps.—G.E.C.
Milliamperemeters.—G.E.C.
Motor generators.—Small Electric Motors.
Charging panels.—Power Equipment Co.
Bronze wire.—T. Bolton & Sons; F. Smith & Co.
Cadmium copper wire.—T. Bolton & Sons.
Electric lifts, Mount Pleasant sorting office.—Marryatt & Scott.
Telephone exchange equipment.—Gerrard (London Area); London trunk exchange; Bedford; Bayswater (London auto. area) : Standard Telephones & Cables. Archway (London auto. area); Erdington (Birmingham auto. area) : G.E.C. Sub-contractors for Erdington : D.P. Battery Co. for batteries; Crompton Parkinson for motor generators; W. Jones & Co. for ringing machines. Canonbury (London auto. area) : Ericsson Telephones. Totton (Southampton) : Siemens Bros. Hillside (London auto. area) : Automatic Electric Co.
Telephonic repeater equipment.—Domburg (Holland); Aldeburgh; Halesworth (Suffolk) : Standard Telephones & Cables.

H.M. OFFICE OF WORKS.
Electric lifts, Aston Cross telephone exchange and Serjeant-at-Arms residence, Houses of Parliament.—Etchells, Congdon & Muir.

Isle of Man.—Electricity Board. Accepted. Transformers.—Johnson & Phillips, Ltd.

Lichfield.—City Council. Accepted. E.h.p. line.—Pirelli-General Cable Works, Ltd.

London.—ST. PANCRAS.—Contracts and Stores Committee. Recommended. Meters.—Chamberlain & Hookham, Ltd.; Metropolitan-Vickers Electrical Co., Ltd. Electric vehicle battery (£174).—Chloride Electrical Storage Co., Ltd.

Newcastle-upon-Tyne.—City Council. Accepted. Electrical wiring of 600 houses on various estates (£1,744).—J. G. Parker and Co., Ltd.

Rawtenstall.—Electricity Committee. Accepted. Cables.—W. T. Henley's Telegraph Works Co., Ltd.

Forthcoming Events

Birmingham Electric Club.—Friday, February 24th. Grand Hotel, Birmingham, 7 p.m. "Electricity Supply Co-ordination." Mr. S. T. Allen.

Electrical Power Engineers' Association (London Technical Group).—Saturday, February 25th. Café Royal, W. 7 p.m. Annual dinner and dance. Tuesday, February 28th. Junior Institution of Engineers. London. 7.15 p.m. "The Design and Construction of Economisers." Mr. R. Pendennis Wallis.

Electrical Trades' Commercial Travellers' Association.—Friday, February 24th. Connaught Rooms, W.C. 6.30 for 7 p.m. Annual dinner.

Architectural Association.—Monday, February 27th. Bedford Square, W.C. 8 p.m. "The Electric Grid Supply and its Purpose." Sir Andrew Duncan.

Institution of Electrical Engineers.—Monday, February 27th. Institution, London. 7 p.m. Discussion on "The Control of Arc Welding." Opened by Mr. W. P. Digby. (*North-Eastern Students' Section*).—Friday, February 24th. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. Debate, "Electric *versus*

Diesel-Electric Locomotives." Saturday, February 25th. Joint visit with the graduates of the N.E. Coast Institution of Engineers and Shipbuilders to the works of the Premier Electric Welding Co., Ltd. (*North-Eastern Centre*).—Monday, February 27th. Armstrong College, Newcastle-upon-Tyne. 7 p.m. "Post-War Developments in High-Pressure Boilers." Messrs. C. H. Davy and C. H. Sparks. (*North-Western Centre*).—Tuesday, February 28th. Engineers' Club, Manchester. 7 p.m. Informal meeting. (*Scottish Centre*).—Tuesday, February 28th. North British Station Hotel, Edinburgh. 7 p.m. "The Present Practical Limits of Power Station Efficiency." Mr. W. S. Burge. (*East Midland Sub-Centre*).—Tuesday, February 28th. Technical College, Derby. 6.45 p.m. Joint meeting with the Institute of Fuel. "A Critical Survey of Modern Tendencies in Boiler Design." Mr. F. Dransfield. (*London Students' Section*).—Tuesday, February 28th. Institution, London. 6.15 p.m. "The Application of Electricity to Farming in Great Britain." Mr. H. Morrell Wright. (*Wireless Section*).—Wednesday, March 1st. Institution, London. 6 p.m. "The Balancing and Stabilising of High-Frequency Amplifiers with special reference to Power Amplifiers for Radio Transmitters." Messrs. W. Ure, E. J. Grainger, and H. R. Cantelo. (*South Midland Centre*).—Wednesday, March 1st. Central Technical College, Birmingham. 7 p.m. Joint meeting with I.C.E. and I.Mech.E. Faraday lecture. "Lightning—and how the Engineer deals with its effects." Prof. J. T. MacGregor-Morris. (*Western Centre*).—Friday, March 3rd. Gloucester. Faraday lecture. Prof. J. T. MacGregor-Morris. (*Meter and Instrument Section*).—Friday, March 3rd. Institution, London. 7 p.m. "An Improved 3-phase, 3-wire, Volt Ah Meter." Mr. G. A. Cheetham. "A Method of Testing Reactive Volt Ah Meters." Mr. R. S. J. Spilsbury.

Paisley Association of Electrical Engineers.—Tuesday, February 28th. Y.M.C.A., Paisley. 7.30 p.m. "Welding." Mr. A. C. Stokes.

Institution of Engineers and Shipbuilders in Scotland.—Tuesday, February 28th. Institution, Glasgow. 7.30 p.m. "Electric Arc Welding in Ship Construction." Mr. J. L. Adam.

Electrical Association for Women.—Wednesday, March 1st. Electrical Housecraft School, S.W. 3 p.m. "Electrical Hints for Spring Cleaning." Miss Anna Holm.

Edinburgh Electrical Society.—Wednesday, March 1st. Philosophical Institution, Edinburgh. 8 p.m. "The Basis of Electrical Prosperity." Prof. W. Oliver.

Physical Society.—Friday, March 3rd. Lecture Theatre, Western Electric Co., Ltd., Bush House, Aldwych, W.C. 5 p.m. Demonstration of an artificial larynx by Major G. Jacques, and films by the company concerned with sound recording or allied subjects.

Notes

The Origin of the "Point Fives"

A correspondent reminds us that the credit for the formation of the "Point Fives" must be given to Mr. A. Hugh Seabrook, who, in a letter, dated May 31st, 1912, wrote to the engineers of certain undertakings suggesting a meeting, which took place on July 13th at Pagani's Restaurant, Great Portland Street, W. Mr. J. Horace Bowden, of Poplar, was appointed to the chair. The others present, with the dates of adoption of the tariff, were: Messrs. H. F. Street, Southampton (March, 1910); W. H. Cooke, Luton (June, 1910); Thomas Roles, Bradford (July, 1910); Alfred S. Blackman, Sunderland (January, 1912); C. S. Davidson, Barnes (April, 1912); and A. Hugh Seabrook, St. Marylebone (May, 1912). Owing to illness Mr. E. Rowley Hill of the Reading Electric Supply Co., Ltd., was unable to be present. His was the only company which had adopted a "point five" tariff.

Meetings continued to be held until about the middle of 1915, a different engineer occupying the chair at each meeting in accordance with the date on which his undertaking had adopted a "point five" tariff. Under the rules it was incumbent upon the chairman to address the meeting for not more than five minutes on some subject relative to the "point five" tariff or the apparatus supplied under such a tariff. A great variety of matters were touched upon, and a specification for a cooker was drafted and discussed in detail.

The last meeting—the eleventh—took place at "Tricity House," 48, Oxford Street, W., on June 17th, 1915, and at that date the membership had increased to twenty-three, comprising, in addition to the previously mentioned eight, Messrs. S. E. Fedden, Sheffield; S. T. Allen, Wolverhampton; W. G. Pickvance, Wrexham; H. Gray, Accrington; J. W. Hame, York; H. F. Friederichs, West Hartlepool; F. W. Purse, Carlisle; J. W. Beauchamp, West Ham; A. H. Shaw, Ilford; Charles Furness, Blackpool; H. A. Nevill, Wakefield; C. M. Shaw, Worcester; Frank Ayton, Ipswich; C. Nelson Hefford, Leeds; and S. E. Britton, Chester.

Mining Electrical Engineers' Dinner

We are informed that owing to the prevailing epidemic of influenza, the dinner dance of the South Wales Branch of the Mining Electrical Engineers, which was to have been held on Friday last, was cancelled.

B.S.S. for Aluminium Alloys

Standard Specifications Nos. 477 and 478 have been issued for wrought bars of duralumin and Y-alloy for general engineering use. They detail the compositions of the alloys and their mechanical properties, and include clauses relating to the provision of test samples and the form of test pieces. Dimensions and tolerances are standardised, whilst in an appendix to each specification are given some helpful notes relating to the preparation and heat-treatment of the respective alloys. The Specification for duralumin covers the requirements of the machinist, and also of the drop forger. The Y-alloy Specifications cover a material used for those parts of internal combustion engines that are exposed to elevated temperatures in service. Copies of these Specifications may be obtained from the Publications Department of the Institution, 28, Victoria Street, S.W.1, price 2s. 2d. each, post free.

I.E.E. (North-Midland Centre)

The North Midland Centre of the I.E.E. is holding its annual dinner on March 10th at the Hotel Metropole, Leeds, at 7 for 7.30 p.m.

The Birmingham Electric Club

The annual dinner of the Birmingham Electric Club will be held on March 7th at the Grand Hotel, Birmingham, at 6.30 for 7 p.m.

The New Sphere Theatre

On page 274 is to be seen an illustration of the attractive system of concealed lighting which has been installed by the Strand Electric & Engineering Co., Ltd., at the new Sphere Theatre, which was opened in Tottenham Court Road, London, this week. Mr. Alistair MacDonald, A.R.I.B.A., is responsible for the design of the new building, Mr. Basil Davis being the electrical consultant. A Philips "Major" model sound-film equipment with double projector is used, while outside the building is a very effective form of neon lighting carried out by Ionlite, Ltd.

Glasgow and the Grid

Divergent views regarding the grid scheme were expressed at the annual dinner of the Glasgow Branch of the Electrical Contractors' Association of Scotland held in Glasgow, on February 14th, at which Mr. James Dundas presided. Mr. W. Finlay, secretary, proposed the toast of "Electrical Supply." Councillor T. S. Park, convener of the Corporation Electricity Committee, in reply, said that the Corporation Electricity Department was not at all happy about coming under the rule of the grid. It had been told that it must reduce its output at the Dalmarnock power station by 7,000,000 kWh and that it must further reduce the staff at Dalmarnock. The Electricity Committee was seething with discontent over the present arrangement. The Board wanted to shut down Dalmarnock during the week-ends and at the fair holiday time, but it had given no satisfactory reason for that up to the present. He told one of the gentlemen of the Board that they had not heard the last of it. The Corporation would go to the House of Commons if necessary, and would do its best to see that the station was maintained at full capacity. The idea behind the grid, he continued, was to cheapen the price of electrical power but he was very doubtful if they would see any cheapening for many years to come. It was a step in the direction of the nationalisation of the whole industry. The Board had assured his Committee that it would try to find jobs for men who were displaced from Dalmarnock.

Mr. G. H. Rowbottom, of the Clyde Valley Electrical Power Company, also replied to the toast. He said the grid was a national effort to increase the demand for electricity. It was a reliable instrument and it was up to them to give it every possible chance. He did not think that the undertaking which was generating in excess of its requirements was in any better position than one which was generating less. Mr. J. Gilchrist proposed "The Electrical Contractors' Association of Scotland," and the chairman replied.

I.E.E. Sheffield Dinner

Preceded by an informal dinner, an address was given by Professor E. W. Marchant, president of the I.E.E., to the Sheffield Sub-Centre on February 14th. He answered the question whether the increased use of electricity was swelling unemployment. Hundreds of thousands of people to-day were employed in manufacturing electrical apparatus. Some labour had probably been displaced by electrical appliances, but the proper way of meeting the situation was to use those appliances and reduce the working hours of those engaged in their manufacture, and in other manual occupations. Electrical engineers were performing a valuable service to the community. Thanks were accorded Prof. Marchant on the proposition of a former pupil of his at Liverpool, Mr. E. Morgan (general manager and engineer of the Sheffield Electricity Supply Department). Mr. L. H. Lowther (chairman of the Sheffield Sub-Centre) presided, and the company included Mr. R. M. Longman (chairman of the North Midland Centre).

Appointments Vacant

Three probationary assistant engineers for the Post Office Engineering Department.

Assistant master for L.C.C. Hackney Technical Institute.

Shift engineer for Aden Settlement

Assistant engineer for Natsbury Mental Hospital, St. Albans.

Deputy distribution engineer for Croydon Electricity Department.

(See our classified advertisements.)

Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the names and addresses of the makers of the following:—

CRESTA automobile lamps.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Sir **Felix Pole** has accepted the position of independent representative of the employers on the Conciliation Committee which is to be set up in the spinning section of the Lancashire cotton industry.

Mr. H. Clarke, constructional engineer to the Fulham Electricity Department, was last week appointed by the Council to be resident engineer during the construction and equipment of the new station. This decision has been made because, under the agreement with the Council of Messrs. Preece, Cardew & Rider, the joint consulting engineers for the extension of the generating station, the appointment of a resident engineer and such other officers as might be necessary for the supervision of the executive of the works on the site was required. Mr. Clarke will be temporarily released from the service to take up the appointment, but on the completion of the extension he will be reinstated in his present position or appointed to some other post in the Department. A temporary constructional engineer will be necessary in the Department during the period, and one is to be advertised for at £450 per annum. The Fulham Council also had before it the matter of extra remuneration paid to

Lord Ashfield, who presided at the "Northmet" Co.'s meeting on Tuesday. (See page 292)

Mr. A. J. Fuller, the borough electrical engineer, as joint consulting engineer. Under the terms agreed upon seven years ago his salary was increased by £4,375 per annum for three years as from October 7th, 1929, the total of the increase, £13,125, being the equivalent of ⅛ per cent. upon the then total estimated cost (£1,500,000), subject to his refunding to the Council £800 per annum to meet the cost of providing assistance for the carrying out of his managerial duties. Mr. Fuller's extra remuneration terminated on October 6th last, but he is still responsible for the extension work, and will remain so until twelve months after the new station is in running order. The total cost of the scheme will be £400,000 more than expected, and further remuneration at ⅛ per cent. on that sum (namely, £3,500) will be paid to Mr. Fuller, spread over three years as from October 7th last. The Council also decided to appoint an assistant engineer with full control under Mr. Fuller.

Dr. Elihu Thomson will celebrate his eightieth birthday in March, and a dinner in his honour is being organised at which leaders in science, engineering, and industry will attend. The dinner is to be held on March 29th at the Massachusetts Institute of Technology, of which Dr. Thomson was acting president from 1920 to 1922, and of which he is now a life member of the corporation. Plans for the tribute to Dr. Thomson provide for an afternoon conference on topics significant to the occasion. These include the historical development of the applications of electricity, the recent experimental trends and latest theories of electricity and matter. It is proposed to exhibit many of Dr. Thomson's inventions and contributions in the electrical field.

Dr. Elihu Thomson

Messrs. G. R. Barclay, J. P. D. Coleman, and **J. E. Oram,** who have held responsible positions with Wild-Barfield Electric Furnaces, Ltd., for a number of years, have been elected to the board of that company.

Mr. H. K. Whitehorn, formerly chief electrical engineer and electrical designer with Tilling-Stevens Motors, Ltd., has been appointed assistant on the senior staff of the Diesel-electric Traction Department of Sir W. G. Armstrong Whitworth and Co. (Engineers), Ltd., at Scotswood, Newcastle-upon-Tyne.

Mr. T. C. Paton, A.I.E.E., has been appointed London representative of M. & C. Switchgear, Ltd., at 36, Victoria Street, S.W.1 (telephone: Victoria 2731). Mr. Paton was recently on the staff of Brookhirst Switchgear, Ltd., and took a leading part in the development of Electric Control, Ltd., Glasgow.

[Elliott & Fry

Mr. H. Clarke **Mr. A. J. Fuller**

Obituary

Sir Robert Donald.—We regret to record the death of Sir Robert Donald, whose interest in electricity supply matters will be recalled by those who remember the sustained attack on private enterprise which appeared in the *Municipal Journal* (of which he was the proprietor) in the early years of municipal electrical development, and at a time when swords clashed every week over the question of municipal v. company trading. Sir Robert had many newspaper interests at different times, but he also had to his credit a full record of public service including the chairmanship of the 1924 Committee on Imperial Wireless Telegraphy and connection with later bodies formed to deal with other aspects of wireless telegraphy as well as broadcasting. The electrical industry, which spent £1,000,000 on the British Empire Exhibition, also recalls the fact that it was through his strong action on one of its committees that the reorganisation of that event was undertaken just in time to bear fruit effectively. Sir Robert, who passed away suddenly on Friday last, was in his seventieth year.

Mr. H. L. Riseley.—The death occurred on February 20th at Gosforth, Newcastle-upon-Tyne, of Mr. Harry Lorrimer Riseley, civil and mechanical construction engineer to the North-Eastern Electric Supply Co., Ltd. He was 63 years of age and had been ill for some time. He leaves a widow and one son. The Dunston power station, which was recently completed, was built under Mr. Riseley's supervision. He served his apprenticeship with the late Dr. Ferranti and later joined the staff of the Gwynne Engineering Co., in whose service he frequently travelled abroad. In 1899 he joined the Newcastle-upon-Tyne Electric Supply Co., Ltd., at Pandon Dene power station. Later he was appointed resident engineer during the construction of Neptune Bank power station at Wallsend, which was opened in 1901. Other stations whose construction he supervised included the Carville "A" and "B" stations, the original station at Dunston, and the North Tees "A" and "B" stations. Mr. Riseley was chairman of the North-Eastern Centre of the Institution in 1906-7.

Mr. A. Davidson.—The death occurred at his home, Linthorpe, Middlesbrough, on February 16th, of Mr. Andrew Davidson, chief electrical engineer of the Britannia and Redcar Works of Messrs. Dorman, Long & Co., Ltd. Mr. Davidson, who was sixty-one years of age, started his career with Messrs. Dorman, Long & Co., Ltd., forty years ago, and from the earliest days was closely connected with the application of electricity to the iron and steel industries. He was an active worker at St. Hilda's Parish Church and also took a great interest in Freemasonry and was one of the earliest members of the Vulcan Lodge. The funeral took place on Saturday last. The chief mourners were his widow and his only surviving brother, Mr. W. R. Davidson. Among those who attended were Mr. W. F. Prentice, general manager, Mr. T. Mensforth, chief engineer, of Dorman, Long & Co., and other representatives of the company.

The late Mr. A. Davidson

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Mackett & Kelk, Ltd.—Private company. Registered February 2nd. Capital, £2,000 in 1,250 6 per cent. cumulative participating preference shares of £1 and 6,000 ordinary shares of 2s. 6d. Objects: To carry on business as electrical engineers and contractors, manufacturers, wholesalers and retailers of electrical and radio apparatus, &c. The permanent directors are: C. K. Kelk, 44, Upper Richmond Road, East Sheen, S.W.14, and two others. Registered office: 44, Upper Richmond Road, East Sheen.

London and Provincial Neon, Ltd.—Private company. Registered February 13th. Capital, £3,000 in 2,900 redeemable non-cumulative 7 per cent. preference and 100 ordinary shares of £1 each. Objects: To carry on the business of electrical engineers, makers and suppliers of and dealers in engineers' and machine tools, manufacturers of and dealers in electrical motive power, heat and light, electro-chemistry, glass tubes filled with neon or other luminous gases, &c. The directors are: M. C. Jones, Thresher's Dean, Headley, Epsom; and Geo. W. Lightfoot, 190, Portsdown Road, Maida Vale, W.9. Registered office: Vincent House, Vincent Square, Westminster, S.W.1.

Irish Electrical Co., Ltd.—Private company. Registered in Dublin February 10th. Capital, £10,000 in 9,000 preference shares of £1 each and 20,000 ordinary shares of 1s. each. Objects: To carry on the business of manufacturers of and wholesale and retail dealers in wireless transmitting and receiving sets, &c. The subscribers are: Miss Catherine McKenna, Seapark Cottage, Malahide, Co. Dublin; and E. A. Harrison, 6, Connaught Street, Phibsboro, Dublin. The first directors are: Wm. J. Dwyer, J. W. Tate and Ursula H. Stanley, addresses not stated.

Delta Lamp Distributors & Electric Suppliers, Ltd.—Private company. Registered in Dublin on February 10th. Capital, £5,000 in £1 shares. Objects: To acquire, supply and sell electric lamps, cables, switchboards, motors, dynamos, &c. The directors are: Jean O. L. Charles, 82, Rue Franklin, Brussels; P. F. McIntyre, 6, Lower Ormond Quay, Dublin; J. Flynn, "Afton," 162, Howth Road, Dublin; and J. Woods, 3, College Green, Dublin.

Western Lamps, Ltd.—Private company. Registered February 18th. Capital, £600 in £1 shares. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in electric and other lamps, electrical apparatus and appliances, etc. The directors are: C. P. Hobson, Brackenside, The Avenue, Tadworth; P. J. Marriage, 63, Burnt Ash Hill, Lee, S.E.12, and J. H. Tillyer, 72, Lyndhurst Drive, Hornchurch, Essex.

E. W. Jones (Electrical), Ltd.—Private company. Registered February 17th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, electrical, radio, mechanical and general engineers, &c. The directors are: E. W. Jones, 4, Park Street, Wellington, Shropshire; E. W. Jones, junr., "Tanfield," Golf Links Lane, Wellington; J. H. Jones, 4, Park Street, Wellington.

Returns of Electrical Companies

Ricardo & Co. Engineers (1927), Ltd.—Capital, £21,000 in 20,000 cumulative participating preference shares of £1 each and 20,000 founders' shares of 1s. each. Last annual return dated November 7th, 1932. All shares taken up. £2 paid on two preference, £20,998 considered as paid on 19,998 preference and 20,000 founders' shares. Mortgages and charges on November 7th: £6,000. On November 18th, 1932, £6,000 debentures were satisfied, and on December 5th, 1932, £3,000 new debentures were created and issued.

Hargreaves, Hamilton & Co., Ltd.—Two mortgages on (a) freehold land and premises known as Bower Mill and No. 32, Gower Street, Farnworth, and (b) freehold and leasehold land with buildings thereon known as Croft Mill, Brownlow Fold, Bolton, both dated January 14th, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd., not exceeding £1,500 and £2,500 respectively.

Electric Supply Co. of Victoria, Ltd.—Capital, £325,000 in 175,000 preference and 150,000 ordinary shares of £1. Return dated November 11th, 1932. 175,000 preference and 125,000 ordinary shares taken up. £50,007 paid, £249,993 considered as paid. Mortgages and charges, nil.

Siemens-Schuckert (Great Britain), Ltd.—The nominal capital has been increased by the addition of £20,000 in £1 ordinary shares beyond the registered capital of £10,000.

British Electric Refrigerator Co., Ltd.—Capital, £100 in £1 shares. Return dated December 31st, 1932. 50 shares taken up. £50 paid. Mortgages and charges, nil.

Ross Electric Light & Power Co., Ltd.—Satisfaction in full on December 28th, 1932, of debentures authorised by resolution dated December 17th, 1903, and registered January 6th, 1904, securing £1,500.

Electrical Components, Ltd.—Satisfaction to the extent of £7,500 on January 24th, 1933, of mortgage dated August 21st, 1930, and registered October 18th, 1930.

Peacehaven Electric Light & Power Co., Ltd.—Issue on February 9th of £1,200 debentures, part of a series already registered.

Inventum Electrical Appliances, Ltd.—Capital, £500 in £1 shares. Return dated December 21st, 1932. 52 shares taken up. £52 paid. Mortgages and charges, nil.

Burndept Wireless (1923), Ltd. (old company).—E. Maloney, 11, Ironmonger Lane, E.C., ceased to act as receiver and manager on January 27th.

City Notes

The Yorkshire Electric Power Co. held its annual meeting at Leeds on February 21st, Mr. R. Armitage (chairman) presiding. In presenting the report and accounts (ELEC. REV., February 10th, page 213), the chairman said the capital expenditure during the year on new plant at Thornhill and the provision and equipment of mains, sub-stations, &c., was £164,977. The total quantity of electricity sold was about 3½ per cent. more than in the previous year, a decrease in the use by collieries being more than met by the increased demands of other power users and of authorised undertakers taking a bulk supply. The company's progress had continued in difficult times on account of the great variety of industries it served and because of the growing use of electricity for domestic purposes. The Thornhill station by the recent extensions and alterations had been brought into the front rank of efficient power stations, and its performance was now superior to that of Ferrybridge. In the published returns for 1931 of the Electricity Commissioners the Ferrybridge station was shown, in respect of fuel consumption, as the most efficient in the Mid-East England area. As an illustration of the economies which had been effected in recent years, the coal used in the company's power stations was now only 40 per cent. of the amount required in 1920. At the beginning of the current year the Central Electricity Board commenced the control of generation by the authorised undertakers in the Mid-East England area, and the Thornhill and Ferrybridge stations were included in the sixteen stations selected to supply the Board's requirements. It was not to be expected that the operation of the Central Board's scheme would show any immediate substantial advantage to the larger and more efficient undertakings. Its first effect would be to enable the inefficient stations throughout the country to be superseded without hardship to their owners by giving to them a share of the economies of production at the more efficient stations. The success of the scheme could be hastened by industrialists and large power consumers using electricity wherever practicable and by the simplification and reduction of the number of distributing undertakings. This policy of unification of distribution had been the aim of the company since its incepton, and as a result of its work a number of small and inefficient stations had been closed and the need for others avoided. They believed that the continuance of this policy of unification would result in still greater benefits as time went on. Two further steps had been taken in this direction in the year under review. The company had undertaken to supply electricity in an area of some 760 sq. miles in parts of the East and West Ridings, and parts of Lindsay in Lincolnshire; the North Lincolnshire and Howdenshire Electricity Co., Ltd. was registered in November last for this purpose, and the capital would be wholly provided by the Power Company, which would hold the shares and operate the new company as part of its business. The new company would commence operations forthwith with a scheme of development which provided for the establishment within three years of distribution centres to supply districts containing about three-quarters of the population in the area. The Power Company had also purchased the whole of the shares of the Barton-on-Humber Electricity Supply Co., Ltd.

The North Metropolitan Electric Power Supply Co. held its annual meeting on February 21st, Lord Ashfield (chairman) presiding. In presenting the report and accounts (ELEC. REV., February 17th, p. 257), the chairman said that the net revenue of £616,159 showed an increase of 21 per cent. over 1931, which was a greater proportional increase for any one year than they had had since 1927. With these satisfactory results under review the directors had decided to make reductions in the charges for electricity in certain districts, which would become operative after the first meter readings taken on and after April 1st next. The second section of the new Brimsdown station was put on commercial load during the year, and the total capacity of the station was now 100,000 kW. It had been necessary to spend a considerable sum on trunk transmission mains to deal with the increased demands, while further expenditure of the same nature would be required this year, particularly between Willesden and Wood Green. The number of consumers supplied directly had increased from 39,000 at the end of 1927 to 102,000 at the end of last year, while the annual revenue in that period increased by £577,000. In the same five years the charge per kWh for lighting and domestic purposes had been reduced by 33 per cent., the quantity of electricity consumed on the contract (two-part) rate in relation to the total domestic supplies having risen from 34 per cent. in 1928 to 58 per cent. in 1932; the average price paid last year by consumers on this rate was 1.38d. per kWh. While the general policy of capital expenditure on extensions was one of the principal reasons for the satisfactory progress made, they had been fortunate not only in the diversity of demand for electricity but also in the rapid growth in the number both of houses and of factories in their area in recent years. The Underground Railway extension from Finsbury Park to Cockfosters had given them a new and important consumer. Lord Ashfield referred to the "hot cathode" lamp for street lighting which has been developed by the General Electric Co., Ltd., and said arrangements had been made with the Wembley Council for the installation of these lamps on a section of the Watford Road. They had hitherto financed their large capital requirements not only by issues of stocks and shares, but also partly by loans and partly by investing their reserves in the undertaking. Recourse to loans and reserves could not be continued indefinitely, and if future capital needs kept pace with those of the past few years, they would have to find further amounts at the rate of about £750,000 per annum. A further substantial issue must be made, therefore, at no distant date, and at the moment they considered

this should take the form mainly of ordinary shares. Shareholders would be informed as soon as the matter was decided.

The Power Securities Corporation, Ltd., held its annual meeting on February 15th, Mr. George Balfour (chairman) presiding. In presenting the report and accounts (ELEC. REV., February 10th, p. 213), the chairman said they had made a satisfactory margin of profit in spite of disturbing conditions at home and abroad. They had handled a fair number of miscellaneous financial transactions, explored new concessions of varied character, and completed a large volume of works at home and abroad, embracing many civil, electrical and mechanical engineering problems. They had during the year completed the foreign hydro-electric project to which reference was made last year, and it had been in operation for several months. They had dealt with new concessions and additional work connected therewith in East Africa and Tanganyika and made progress with negotiations in various parts of the world. The Hungarian negotiations had inevitably been held in abeyance, but progress had been made by the Government and themselves in the technical studies, and they hoped that in the near future the European atmosphere would be clearer and allow progress to be made. They had carried out a large amount of engineering work at home and abroad through the organisation of Balfour, Beatty & Co., and contracts on hand uncompleted, or on which no profit had been brought into the accounts, amounted to over £3,000,000.

Hall Telephone Accessories (1928), Ltd., held its annual meeting on February 15th, when Major the Hon. Oscar M. Guest (chairman), who presided, said that while the company had been fully employed throughout the year they had had to work at a small margin of profit, and this was the reason for the diminution in trading profits. They had adapted themselves to these conditions by increased machinery and tools, and were fortunate in starting the current year with the prospect of being able to keep the works and employés fully occupied. Currency and tariff difficulties had brought their European work practically to a standstill, and that was why they had considered it advisable to liquidate their small Continental subsidiary. Their Empire business continued, and when general conditions improved this should expand.

The St. James' & Pall Mall Electric Light Co., Ltd., reports a net profit for 1932 of £75,477, as compared with £69,510 in the preceding year, to which is added £49,885 brought in, making £125,362. The standard ordinary dividend (7 per cent.) is paid and £4,896 is appropriated to co-partners, leaving £59,532 to be carried forward. The sales of electricity increased from 42,640,317 to 43,975,364 kWh, and the connected load from 44,212 to 45,282 kW. The board has fixed the new standard price to be operative from January 1st, 1932, and has submitted it to the London & Home Counties J.E.A. for approval. The Central Electric Supply Co., Ltd. (the share capital of which was owned in equal proportions by the St. James' & Westminster companies) went into voluntary liquidation in October last, and its assets have been distributed. Meeting: February 28th.

The Westminster Electric Supply Corporation, Ltd., reports a total revenue for the year ended December 31st last of £674,985, as compared with £690,464 in the preceding year, and a net profit of £150,766 (£151,425), to which is added £644 brought in, making £151,410. The preference dividend and standard ordinary dividend (7 per cent.) are paid, leaving a balance of £26,162 to go forward, subject to adjustment upon the determination of the new standard prices to operate from January 1st. The number of meters connected increased from 37,946 to 39,259, and the sales of electricity from 83,721,638 to 85,889,066 kWh. The report records the deaths of Sir William Porter, Bt., who retired from the board in September last, and Lord Remnant. Mr. C. Parker, general manager and secretary, and Mr. R. H. Cale have been appointed to the board. Meeting: February 28th.

Westinghouse Brake & Saxby Signal Co., Ltd., held its annual meeting on February 9th. Lord Southborough referred to the difficulties of the year, especially for companies carrying on a large export business. He added that the struggle had been a severe one, and for that reason he had to repeat by way of explanation the reasons given for limiting the dividends to 3½ per cent. and making generous provision to meet future difficulties. The speaker alluded to the signalling and brake equipment supplied to the Southern Railway, also to the progress made with the Westinghouse metal rectifier. The company is about to put on the market the "Westector" for use in the detector circuits of radio receivers.

The Northampton Electric Light & Power Co., Ltd., reports a revenue of £285,639 for 1932, as against £264,371 in the preceding year, and a balance after meeting expenses of £106,148. The ordinary dividend is maintained at 10 per cent., and £10,953 is carried forward. An issue of 100,000 ordinary shares was made in February, 1932, and in April £63,000 five per cent. debenture stock was placed at 99 per cent. The report states that a supply of electricity has commenced in a number of additional villages. Sales increased by 11 per cent. to 49,616,271 kWh.

The Rushden and District Electric Supply Co., Ltd., reports a total income of £41,029 for 1932 (against £38,721 in 1931), and a balance, after deducting expenses, of £11,577 (£11,057). A dividend of 8 per cent. is again paid on the ordinary shares and £1,639 is carried forward. The sales of electricity amounted to 4,340,906 kWh, an increase of 7½ per cent.

The Midland Electric Manufacturing Co., Ltd., reports that for 1932 there was a net profit of £36,405 (against £38,946), which, with £17,790 brought in, profit on sale of investments (£8,906), and other income, makes £63,451. As announced in our last issue, the ordinary dividend is again 10 per cent., with a bonus of 12½ per cent., making a total distribution of 22½ per cent. Reserve receives £20,000 (£10,000), and £19,898 is carried forward.

The Smithfield Markets Electric Supply Co., Ltd., reports a net profit of £11,371, which with £2,999 brought in makes £14,370. After deducting the interim dividend there is a balance of £12,570. The balance of 4 per cent. debenture stock outstanding amounting to £12,390 was redeemed on December 12th last. Negotiations for the purchase of company's property by the Corporation of London are now completed, and an extraordinary meeting will be held at the close of the annual meeting on March 1st for the purpose of passing a resolution for voluntary winding up and the appointment of liquidators.

The Perak River Hydro-Electric Power Co. has placed privately £400,000 of four per cent. prior lien debenture stock at 98½. Interest will be payable on March 31st and September 30th, and a full six months' interest will be paid on September 30th next. The principal, with accrued interest, will be repaid at par on August 1st, 1938, but the company has the option to repay the whole or part of the stock at par on or after August 1st, 1937.

Mather & Platt, Ltd., reports a net profit for the year ended December 31st last of £106,978, as compared with £76,124 in the previous year. To this is added £29,057 brought in and profit on investments (£27,811), making a total of £163,846 available. Special reserve receives £27,000 and the ordinary dividend is again 6 per cent., less tax, leaving £35,027 to be carried forward.

The Bristol Tramways & Carriage Co. reports a revenue for 1932 of £1,152,514 (against £1,175,544 in 1931), and net revenue, with the balance brought in of £124,719 (£151,722). It is proposed to pay a final ordinary dividend of 3 per cent., making 5 per cent. for the year (against 8 per cent.), to place £10,000 to contingencies and renewals reserve, and to carry forward £6,044.

The National Gas Engine Co., Ltd., proposes to pay a dividend on the preference shares. The directors state that there has been a loss as a result of the year's trading, but a sum has been transferred from general reserve to cover the loss and to provide for the preference dividend.

Lissen, Ltd.—The Ever Ready Trust Co. has invited applications for the purchase from it of 400,000 eight per cent. cumulative preference shares of £1 each fully paid of Lissen, Ltd., at 23s. per share. The shares are to be sold with the benefit of the dividend accruing thereon.

The Llanelly & District Electric Supply Co., Ltd., reports a profit for 1932 of £59,969. An ordinary dividend of 4½ per cent. less tax (against 4 per cent.) is recommended, and £3,740 is carried forward.

The Metropolitan Electric Supply Co. has recommended a final dividend at the rate of 14 per cent. per annum (same) on the ordinary shares, making 10 per cent. for the year.

The Midland Counties Electric Supply Co., Ltd., has announced a final ordinary dividend of 4½ per cent., making 7 per cent. for the year, the same as for 1931.

The County of London Electric Supply Co., Ltd., proposes to pay a final dividend of 7½ per cent. on the old ordinary shares, making 10½ per cent. for the year (same).

Clarke, Chapman & Co., Ltd., have announced a final ordinary dividend of 1¼ per cent., making 3¾ per cent. for the year (against 5 per cent.).

Crossley Bros., Ltd., report a net loss for 1932 of £30,533 (against a loss of £59,671 in 1931), which, deducted from £43,817 brought in, leaves £13,283 to be carried forward.

Charles Clifford & Son, Ltd., reports a profit for 1932 of £5,263, and, with a balance brought in, a total of £38,669 is available. The ordinary dividend is 10 per cent., and £30,870 is carried forward.

The Clyde Valley Electrical Power Co. has declared a final dividend of 4 per cent., less tax, on the ordinary shares, making 7 per cent. for the year (same).

The Macintosh Cable Co., Ltd., has increased its capital to £250,000 by the creation of 150,000 £1 ordinary shares.

The South London Electric Supply Corporation, Ltd., recommends a final ordinary dividend of 4 per cent., making 7 per cent. for the year (the standard dividend).

Stocks and Shares

TUESDAY EVENING.

THE City is vastly interested at the present time in all the questions that surround gold and currency. The reason for the revival of this popular attention is the fact of the New York Rate showing a distinct tendency to cheapen the dollar, and therefore to increase the value of the £ sterling. Money is once more flowing into this country at a rate that for the moment appears to be rather embarrassing.

New issues are taken readily. So long as a borrower has sound stock to offer he can be assured of getting a good price for it, and of placing it without any difficulty. The Perak River Hydro Electric Power Company has sold £400,000 of its 4 per cent. prior lien debenture stock at 98½, less ½ per cent. commission. The stock has come on offer to the public at 99¾. The 4½ per cent. debenture stocks of the electricity authorities hold their rises at 108 for the Central Electricity, and 107 for the London and Home Counties stock. London Power 4 per cent. debenture has risen to 104½. Home Railway priorcharge issues have made further additions to their previous prices. City and South London 5 per cent. preference stocks, of all four issues, have advanced to 108½. Debenture stocks in the group of electrical manufacturing and equipment companies are standing at prices which would offer temptation to the holders to sell, were it not for the difficulty of finding other securities of equal calibre to replace them.

Cables and Wireless

Imperial and International Communications has made the interesting announcement that the periodical issue of infor-

mation regarding its estimated message receipts is to be resumed. This will appear in the form of a monthly index figure, to be published on the 20th of each month. The January figures were issued early this week. The company goes back to January, 1930, and shows the index numbers month by month. The first number is 96 per cent., and, comparable with this, the figure for the January just ended is 69.9. The lowest index number touched during the three years under review was 61.8 in August, 1931. Last year's low level was 63.2 in July. In December it rose to 78.8, so that the present year makes a poor start. Criticism is directed against the figures as being liable to mislead, in view of the fact that no estimate can be made of the economies that the combine has succeeded in effecting. It is known that these savings are considerable, but as there is no trace in the table of what the economies represent opinions differ as to the value of the three years' comparisons.

Cables & Wireless stocks are lower on the week, shedding part of the improvements that they gained just previously. American Telephone & Telegraph has receded to 147½, and International Telephone and Telegraph to 9. Globe Telegraph ordinary have fallen back to 11½, in sympathy with the dullness in Cables & Wireless. Marines at 33s. 9d. are 1/8 easier. Great Northern Telegraphs have fallen 10s. to 27½.

Home Electricity Supply

No changes of consequence have occurred in the prices for London Electricity Supply Companies' shares, the only quotable alteration being a rise of 6d. in North Metropolitan Electric preference. The group of provincial companies' issues is, however, as strong as ever. Lancashire Light & Power have risen to 33s. 9d., Midland Electric Power to 38s. 9d., Northamptons to 52s. 6d., Yorkshires to 43s. 9d. It may be significant to notice that the buying comes mostly from the provinces. The present-day investor, reluctant to accept the yield of 2½ per cent. net offered by British Government and other gilt-edged stocks, and equally unwilling to take the risks involved in the purchase of gold mining shares, sees little in between these two classes except such industrial ventures as those of the electricity supply companies, whose area of distribution is large, and whose scope for expansion, upon any increase in general trade, is still considerable. On this line of argument he is content to buy the provincial electricity shares, in spite of the extremely modest yield which they afford. There is little risk of seeing his capital depreciate; there is, on the other hand, a reasonable prospect of improvement both in dividends and in the prices of the shares.

Foreign Stocks

Most of the stocks connected with the dollar show losses on the week. Brazilian Tractions have fallen to 90. Mexican Light & Power common and Mexico Tramways are weak at 7½. Hydro-Electrics have dropped to 6¾, although the company's preferred shares have moved up a trifle to 8¾. Shawinigan Water & Power common are 13, Consolidated Gas & Electric of Baltimore 85. Power Corporation of Canada are lower at 8.

In the foreign group, Tokyo Electric sixes have given way to 61½ on the apprehension felt of possible hostilities between China and Japan. Prussian Electric sixes are lower at 85, owing to sympathetic flatness with German Government and municipal bonds, these having been sold on account of the political developments in the country.

Manufacturing and Equipment

Ordinary shares in the group of manufacturing and equipment companies maintain their prices with firmness. An exception is Brush ordinary stock, the price of which has gone back to 55. Ferranti preference strengthened to 24s. A good many well-known industrial companies are reducing their dividends at the present time. Companies find that they have to sell their goods at pre-war prices, although, on the other hand, their standing charges are determined by post-war conditions. The result is, as some of the recent reports testify, a larger turnover of business resulting in a smaller amount of profit and, consequently, a diminished dividend.

Ever-Ready shares are unchanged at 30s., and Ever-Ready Trusts, in which the recent speculation seems to have subsided, are 20s. 6d. On Thursday in this week the subscription lists are to open for the sale of 400,000 8 per cent. cumulative preference shares of £1 each, at 23s. per share, of Lissen. Shareholders in Ever Ready and Ever Ready Trust will be given preferential consideration. Callender's debenture has risen 3 points to 105½. Enfield Cables preference are better at 32s. Electrical Finance ordinary have strengthened to 59s. 6d. Philips Lamp are a weak spot at 27s. 6d.

Home Railways and Tramways

Metropolitan Railway consolidated stock has eased off to 65, otherwise the list of stocks in the Home Railway market is very quiet. Of the Tramway issues, London United Tramway 4 per cent. debenture at 70½ has gained 3 points. London and Suburban Traction ordinary strengthened to 1s. 6d. Yorkshire West Riding Tramways preference are better at 17s. 6d. British Electric Traction preferred at 136½ and the company's 4½ per cent. second debenture at 102½ have both advanced. The iron and steel market is dull owing to the inactivity of the heavy industries. Babcock & Wilcox at 37s. 6d. are 2s. 6d. lower. Vickers keep steady at a little under 7s. The company is one of the many others that is about to take steps for reducing the interest on some of its prior-charge stock.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1930.	1931.	Price, Feb. 21.	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	72/6	—	4 2 8
Brompton Ordinary	1	8½	8½	33/6	—	4 3 7
Central Electricity 4½% Deb.	Stock	4½	4½	108	—	4 3 4
Charing Cross Ordinary	1	8½	8½	33/6	—	4 3 7
Chelsea	1	8½	8½	33/–	—	4 4 10
City of London	1	10	10	34/6	—	4 1 2
Clyde Valley	1	8	7	35/–	—	4 0 0
County of London	1	11	10½	53/3	—	4 0 2
Edmundsons' 7% Pref.	1	7	7	29/6	—	4 15 0
Elec. Dis. Yorkshire	1	9	9	43/9	—	4 2 2
Elec. Supply Corporation	1	11	11	65/–	+⅛	3 7 8
Kensington Ordinary	1	8	8	33/6	—	4 3 7
Lancs. Light and Power	1	6½	7	33/9	+6d.	4 3 2
London & Home Counties 4½% Deb.	Stock	4½	4½	107	—	4 4 0
London Electric	1	9	9	33/–	—	4 4 10
Metropolitan	1	10	10	50/–	—	4 0 0
Midland Counties	1	7	7	35/–	—	4 0 0
Mid. Elec. Power	1	8	8	38/9	+¼	4 2 6
North Eastern Electric Ordinary	1	6	6	29/6	—	4 1 4
Do. 7% Pref.	1	7	7	32/–	—	4 7 6
Northampton	1	10	10	52/6	+⅛	3 16 0
Notting Hill 6% Pref.	10	6	6	12¾	—	4 14 0
North Met. Elec. 6% Pref.	1	6	6	29/6	+6d.	4 1 4
St. James' and Pall Mall	1	8	8	33/–	—	4 4 0
Scottish Power	1	8	8	35/9	—	4 9 5
South London	1	8½	8½	33/–	—	4 4 10
Urban Ordinary	1	7	7	34/6	—	4 1 2
Westminster Ordinary	1	8½	8½	33/–	—	4 4 10
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	17/6	—	8 11 2
Yorkshire Elec.	1	8	8	43/9	+6d.	3 13 2
HOME RAILS.						
Central London Ord. Assented	Stock	4	4	85½	—	4 13 7
Metropolitan	„	3½	2½	65	–1	3 17 0
Do. District	„	5	4½	56½	—	5 6 2
Underground Electric	1	8	7	18/–	—	5 0 0
TELEGRAPH AND TELEPHONES.						
American Tel. & Tel.	$100	9	9	147½	–3	6 2 0
Anglo-Am. Tel. Pref.	Stock	6	6	106	—	5 13 0
Do. Pref.	„	1½	1½	25	–½	6 0 0
Cables & Wireless 5½% Pref.	„	5½	2¾	81½	–4	3 7 6
Do. A 7½% Ord.	„	—	Nil	27	–2	—
Do. B Ord.	„	—	Nil	11	–1	—
Globe Tel. and T. Ord.	10	8½	Nil	11½	–½	—
Do. do. Pref.	10	6	6	11¾	+¾	5 1 2
Great Northern Tel.	10	20	20	27½	–½	7 5 6
Marconi-Marine	1	15	10	33/9	–⅛	5 18 6
Oriental Telephone Ord.	1	12	12	3	—	*4 0 0
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	—	—	1/9	—	—
Do. do. 2nd Pref.	5	—	—	1/9	—	—
Do. do. 5% Deb.	Stock	—	—	6	—	—
British Electric Traction Def. Ord.	„	5	5	235	—	—
Do. do. Pref. Ord.	„	8	8	136	+1½	5 17 8
Brazil Traction	100	—	—	9½	–1½	—
Brit. Columbia Elec. Rly. Pcc.	Stock	5	5	102½	—	4 19 6
London & Sub. Trac. 5% Pref.	1	Nil	Nil	12/–	—	—
London United Tram Deb.	Stock	4	4	70½	+3	5 13 6
Mexico Trams, 5% Bonds	—	5	5	47½	—	10 10 6
Mexican Light Common	100	Nil	Nil	5½	—	—
Do. 7% Pref.	100	7	7	15	—	—
Do. 1st Bonds	—	5	5	77½	+1	6 9 0
Victoria Falls Ord.	1	15	15	74	—	3 15 0
Yorkshire (West Riding)	1	Nil	Nil	5/6	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	6	4	17/6	—	4 11 5
Do. Pref.	1	8	8	32/–	—	5 0 0
Babcock & Wilcox	1	14	14	37/6	–½	—
British Aluminium Ord.	1	10	5	25/–	—	4 0 0
British Insulated Ord.	1	15	15	67/6	—	4 8 4
Brush Ord.	Stock	5	Nil	55	–2	—
Callender's	1	15	15	3	—	5 0 0
Do. 6½% Pref.	1	6½	6½	28/3	—	4 12 0
Crompton Parkinson Ord.	5/–	30	24	22/6	—	5 0 0
Do. 8% Pref.	1	8	8	30/–	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	24/6	—	6 2 5
Do. 5% Deb.	Stock	5	5	102½	—	4 17 7
Electric Construction	1	Nil	Nil	12/–	—	—
Enfield Cable Ord.	1	25	25	4½	—	5 8 1
English Electric	1	Nil	Nil	12/6	—	—
Do. do. Pref.	1	Nil	Nil	16/–	—	—
Ever Ready	5/–	35	35	30/–	—	5 16 0
Ferranti Pref.	1	7	7	24/–	+3d.	5 18 0
G.E.C. Pref.	1	6½	6½	29/6	—	4 8 2
Do. Ord.	1	10	8	42/–	—	3 16 2
Henley's	1	30	30	6⅛	—	4 15 1
Do. 4½ Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	2/6	—	—
Johnson & Phillips	1	10	5	1	—	5 0 0
Siemens Ord.	1	7½	7½	26/3	—	5 14 1
Telegraph Construction	£1	Nil	Nil	16/3	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1931

13909. "Controlling systems for electric circuits." International General Electric Co., Inc. May 10th, 1930. (386976.)

18019. "Means for intermittently opening and closing a.c. electric circuits." British Thomson-Houston Co., Ltd. (General Electric Co.) June 22nd, 1931. (386992.)

20727. "Automatic switches for electrically driven machines." C. W. Whitehead and New Era Electro Devices, Inc. July 20th, 1931. (386979.)

21212. "Electric signalling systems." Automatic Electric Co., Ltd., E. C. Oliver, and L. M. Simpson. July 24th, 1931. (386973.)

21361. "Device for the prevention of dialling automatic telephones." H. Andrew and M. King. July 27th, 1931. (386984.)

21707. "Manufacture of continuously loaded signalling conductors." W. S. Smith and E. W. Smith. July 29th, 1931. (387007.)

21743. "Heat treatment of magnetic materials." Electrical Research Products, Inc. July 31st, 1930. (Addition to 342676.) (387009.)

21814. "Magnet cores for use in loading coils and the like." Automatic Electric Co., Ltd., and P. N. Roseby. July 30th, 1931. (387010.)

22970. "Electric synchronising apparatus." British Thomson-Houston Co., Ltd., and A. L. Whiteley. August 14th, 1931. (387018.)

24115. "Protection of electrical apparatus against abnormal currents." G. F. Shotter and F. C. Knowles. August 27th, 1931. (387023.)

24140. "Electric motors." British Thomson-Houston Co., Ltd. August 28th, 1930. (387024.)

25246. "Method of and apparatus for electrically operating or controlling road traffic signals automatically." W. H. Scott and S. E. Glendenning. September 8th, 1931. (Cognate application 11383/32.) (387030.)

25819. "Snap action electric switches of the enclosed type." J. A. Crabtree. September 15th, 1931. (387033.)

26085. "Dynamo-electric machines." A. Tustin and Associated Electrical Industries, Ltd. September 17th, 1931. (Cognate application 2406/32.) (387035.)

26910. "Electric cut-out." A. Barnett. September 26th, 1931. (387037.)

28678. "Electric circuit breakers." British Thomson-Houston Co., Ltd., and H. Trencham. October 15th, 1931. (387046.)

29228. "Thermionic amplifying apparatus." W. T. Sanderson and R. Blackburn. October 21st, 1931. (387050.)

29618. "Automatic telephone systems; party line services." W. E. Nicol and F. E. Nicol. October 26th, 1931. (Cognate application 33950/31.) (387052.)

30833. "Automatic controlling apparatus for electric motors." L. B. Hewitt and Metropolitan Electric Tramways. November 6th, 1931. (387056.)

32125. "Electrical arc resistant materials." British Thomson-Houston Co., Ltd. November 19th, 1930. (387066.)

32847. "Electric heating appliances." N. Dennes and Associated Electrical Industries, Ltd. November 26th, 1931. (387072.)

33799. "Galvanic batteries." Oldham & Son, Ltd., and W. D Wilde. December 5th, 1931 (387079.)

34420. "Devices for electrically insulating metallic bars." International General Electric Co., Inc. December 11th, 1930. (387083.)

35262. "Television." M. Von Ardenne. December 22nd, 1930. (387087.)

1932

699. "Stators or fixed field systems for dynamo-electric machines." A. Tustin and Associated Electrical Industries, Ltd. January 9th, 1932. (387104.)

798. "Stators or fixed field systems for dynamo-electric machines." H. Rusby and Associated Electrical Industries, Ltd. January 11th, 1932. (387106.)

1347. "Electric clocks." English Clock & Watch Manufacturers, Ltd., and H. N. Walford. January 16th, 1932. (387108.)

2055. "Multiple radio-telephony and radio-telegraphy." W. A. Loth and A. J. Givelet. January 23rd, 1931. (387114.)

2707. "Electrical connection devices." W. W. Robinson. January 29th, 1932. (387120.)

3012. "Electronic discharge tubes." Radiotechnique. February 12th, 1931. (387123.)

3501. "Loud-speakers." General Electric Co., Ltd., and D. A. Oliver. February 5th, 1932. (387127.)

3972. "Electric discharge tubes for generating ultra-violet rays." Dr. C. Hummel. February 11th, 1931. (387130.)

4131. "Potentiometric circuit arrangements, for use, for example, in radio transmitters." Marconi's Wireless Telegraph Co., Ltd. February 11th, 1931. (387132.)

5249. "Electrically operated valves for fluids such as gas." E. Juchheim and W. Juchheim (trading as H. J. Juchheim, a firm). November 19th, 1931. (387138.)

5883. "Grid type resistors for use in electric furnaces." Birmingham Electric Furnaces, Ltd. (Electric Furnace Co.). February 27th, 1932. (387142.)

6263. "Clock-operated electric switches and valves." A. D. Ohlson and H. Broad. March 2nd, 1932. (387143.)

6730. "Electric resistances." H. Baron (Siemens and Halske Akt.-Ges.). March 5th, 1932. (Convention date not granted.) (387150.)

6839. "Glass bulbs for incandescent electric lamps." L. F. De Backer. March 7th, 1932. (387152.)

10497. "Bow collector for electric traction." E. Conradty and O. Conradty (trading as C. Conradty). April 25th, 1931. (387172.)

11664. "Modulating arrangements for telephonic transmitters." L. Pungs. May 2nd, 1931. (387182.)

12107. "Electric current supply systems." Igranic Electric Co., Ltd. April 29th, 1931. (387186.)

13717. "Luminous electric discharge lamps." General Electric Co., Ltd. June 29th, 1931. (387193.)

14981. "Apparatus for producing coloured pictures by means of electronic-ray valves." Siemens-Schuckertwerke Akt.-Ges. May 30th, 1931. (387206.)

15886. "Automatic electric switches, more particularly of plug form." Stotz-Kontakt Ges. June 4th, 1931. (387213.)

18240. "Electrical condensers." Elektrizitäts-Akt.-Ges. Hydrawerk. August 18th, 1931. (387227.)

20095. "Hydro-electric stations." British Thomson-Houston Co., Ltd. July 15th, 1931. (387239.)

20291. "Television and like receivers." Telefunken Ges. für Drahtlose Telegraphie. July 18th, 1931. (387240.)

22222. "Mercury arc rectifiers." Westinghouse Electric & Manufacturing Co. September 2nd, 1931. (387249.)

25191. "Cathode-ray tubes." International General Electric Co., Inc. September 12th, 1931. (387275.)

25879. "Electrical condensers." Dubilier Condenser (1925), Ltd. September 26th, 1931. (387282.)

28215. "Means for protecting high-pressure distribution systems." International General Electric Co., Inc. October 10th, 1931. (387291.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from February 15th:—

Sipia. No. 533549. Class 4. Electrodes of carbon or of substances in which carbon predominates, for use in arc lamps, searchlights, projection apparatus, electric ovens, electrolytic baths, &c.—Siemens Plania Werke Gesellschaft, Lichtenberg, Berlin, Germany. (British representatives: Haseltine, Lake & Co., 28, Southampton Buildings, Chancery Lane, W.C.2.)

Mastersinger (lettering and design). No. 537871. Class 8. Wireless telephonic receiving apparatus.—W. J. Harris & Co., Ltd., 65, Haymerle Road, Peckham, S.E.15.

Resectotherm. No. 538215. Class 11. Apparatus for surgical diathermy.—Watson & Sons (Electro-Medical), Ltd., Sunic House, 43-47, Parker Street, Kingsway, W.C.2.

Ramos. Class 537612. Class 13. Electric lamps (ordinary). No. 537613. Class 50. Insulating parts of electrical fittings made of condensation products of phenol and formaldehyde.—Benjamin Sacov, trading as the Universal Electric Lamp Co., 61-63, Great Eastern Street, E.C.2.

Thermelec (lettering and design). No. 534628. Class 18. Electric hot plates and warming plates, heating, cooking, and toasting stoves, car heaters, and electrically heated towel rails, &c.—Forward Electric Co., Ltd., Stonehouse Works, Holly Lane, Perry Barr, Birmingham.

Electric Motor Cars

SHORTLY after the end of the war a demand arose for a small reliable vehicle, applicable to all conditions, and easily attended to. It had to be noiseless and non-smelling, since it was to be used in yards and enclosed spaces. The electric car met these conditions and opened up a new field. After a few years a number of well-designed types were shown at the Leipzig Fair.

In Germany a traffic by-law of March, 1928, directed that any mechanically propelled vehicle of more than three tons dead-weight for use in the streets had to be fitted with pneumatic tyres, and this gave a strong impetus to the electric truck industry in that country. Since the size of the tyres was calculated according to the pressure of the wheels, large wheels became necessary and this led to a change in the general arrangement as well as the exterior construction. The radius of action was increased owing to reduced tyre friction, and greater resilience allowed higher speeds. Thus a vehicle came into being, something half-way between an electric lorry and an electric motor car, a vehicle which had been badly wanted, and which would probably have been evolved much earlier had it not been for a certain conservatism and the desire for a uniform process of manufacture to lower the cost.

It is possible that the "flat-fronted" appearance of the "electric" has somewhat prejudiced its chances. The outward appearance of these modern German battery-driven street vehicles differs very little from that of lorries or trucks with petrol engines, as will be seen from the illustrations which appear on p. 279. Their speed reaches the maximum allowed for lorries within towns (18½ m.p.h.), and their radius of action (between 43 and 50 miles) is greater than one day's journey of most cars employed for local traffic. In addition, they have all the advantages of the electric lorry, and are therefore greatly superior to any other means of conveyance for town work. Of even greater importance than economy and ease of attendance is the absence of noise and smell.

There is a vast difference between cars which run in one town only and those which are intended to run between towns, and it is here that the electric car has advantages. For conveying goods and merchandise a vehicle suitable for town traffic is essential. With progressive improvements in roads it may be assumed that before long a large amount of heavy traffic within large towns will be electrically driven.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashton-under-Lyne.—Cinema (£30,000), Crickets Lane, for Lancashire Entertainments, Ltd., 5, Cathedral Yard, Manchester.

Ayr.—Greyhound racing track (£2,700); A. Beattie, Drumgray Gardens, Airdrie.

Bacup.—Rebuilding of Heald Wesleyan Chapel, with electrical installation (£3,000); A. Brocklehurst, St. James Chambers, Waterfoot.

Bathgate.—Houses (84); burgh surveyor.

Birkenhead.—Houses (300), between Birkenhead and Prenton, for the Hamilton Estates, Ltd.; M. W. & W. Shennan, architects, 15, Hamilton Square.

Birmingham.—Houses (114) on Corporation Estates; D. James, Civic House, Great Charles Street.

Blackpool.—Houses (44), Beaufort Avenue; R. Fielding & Son, builders, Stanhope Road Works. Cinema and café, Red Bank Road; C. Dunn, Branch library, Layton (£3,300); borough engineer. Junior school, Russell Avenue, for E.C.

Bolton.—Houses (30), Devonshire Road Estate; A. T. Reynolds & Co.

Bridlington.—Maternity and child welfare centre; borough engineer.

Brierley Hill.—Houses (40); G. Smith (Birmingham), Ltd., builders.

Bristol.—Houses (22). Dings Estate (£6,358); J. Knox (Bristol), Ltd. Cinema, Queen's Avenue; F. Wilkins, builders, 24, Temple Backs.

Carlisle.—Hotel, Botchergate, for Mrs. Alderson (electrical installations); H. E. Scarborough, 22, Lowther Street.

Carnarvonshire.—Central School, Bangor (electric lighting installations); G. & J. P. Gregory, Ltd., builders, 24, High Street, Carnarvon.

Croydon.—Houses (24), Davidson Road; F. Fowles, 65, Sunny Bank, S.E. Re-housing Old Town (£29,000); borough engineer. Factory extension, Canterbury Road; Wallis, Gilbert & Partners. Factory, Selsdon Road; E. Bates, 27, Queen Victoria Street, E.C.4.

Dalbeattie.—Business stores for Dumfries and Maxwelltown Co-operative Society; D. Cook, managing secretary, 4, Queensberry Street, Dumfries.

Darlington.—Offices for the United Automobile Services, Ltd. (£10,000); A. L. Wallis, architect, 20, Victoria Street, S.W.1. Senior mixed school; E. Minors, borough engineer, Town Hall.

Dartford.—Houses (112), Heath Lane site; U.D.C. surveyor.

Dewsbury.—Houses (32), Malvern Road, for A. Smith.

Dudley.—Technical college (£90,000); borough surveyor, Town Hall, Priory Street.

Ealing.—Houses (21), Hill Rise; C. & T. Ware, 62, Birkbeck Avenue, Greenford. Houses (21) for Smirk & Sons, Federal Road and Fairfield Drive; G. L. Russell, architect, 1, Broad Street Buildings, E.C.2. Factory for J. M. Comminos, Wadsworth Road; J. Batty, architect, 142-3, Minories, E.C.3. Shops and offices, Broadway Station; T. Brammal Daniel, architect. Eleven shops, Windmill Lane; Morris Estates, Ltd., Dorland House, Regent Street, S.W.1.

Edinburgh.—Houses (43) at Northfield; J. Miller, builder. 88, Hanover Street. Houses (432), Niddrie Mains, and primary school, Balgreen Road (£26,000); city architect. Chapel for Craiglockhart Training College; R. Fairlie, architect, 7, Ainslie Place. Churches, Barnton and Saughton; Edinburgh Presbytery.

Enfield.—Houses (170), Sunnyside Estate; Homemakers, Ltd.

Gerrards Cross (BUCKS).—Extensions, Bull Hotel (£6,500), for Ethorpe Hotel, Ltd.; H. H. Robinson, director.

Glasgow.—Houses (174), Calton; architect, housing dept. Houses (80), Clarkston; J. Wright, builder, Clarkston. Houses (297), Shuna Street, Ruchill; housing director. Stores and workshop, Polmadie Road; Acme Tea Chest Co., Ltd.

Gravesend.—Cinema, Albert Place; L. Prior.

Great Yarmouth.—Theatre, Regent Road; Regal Theatre Co.

Grimsby.—Subway, Weelsby Road Level Crossing (£11,358); Fletcher & Co. (Contractors), Ltd., Mansfield.

Herne Bay.—Houses (100). Sea Street Estate; Goodwin & Russell, Ltd.

Hindley.—Houses (84); O. P. Abbott, surveyor, Council Offices.

Horsley (SURREY).—R.C. church; Fr. H. R. Prince, Effingham.

Ilford.—Houses (1,000), Padnall Estate; Padnall Estates, Ltd.

Irish Free State.—(CRUMLIN, Co. DUBLIN).—Church for Rev. Father Sheehan. Terenure: Ashlin & Coleman, architects, 7, Dawson Street, Dublin. (NEWPORT, Co. TIPPERARY).—Church for Rev. W. J. Condon; W. H. Byrne & Son, architects, 20, Suffolk Street.

Kent.—Central school, Mill Pond Wood, Sevenoaks, for E.C.

Kidderminster.—Houses (108); B. Denning, builder, Bloxwich Road, Walsall.

Kilmarnock.—Houses (100); burgh surveyor.

Lancashire.—Junior school, Huyton, for E.C.

Lancing (SUSSEX).—Ritz Cinema; A. W. Gates, builder, Shoreham-by-Sea.

Leicester.—Schools (electrical installations) for the Rev. B. C. George; Bedingfield & Grundy, architects, 9, The Crescent, King Street.

Liverpool.—Post Office parcels and sorting offices, Hatton Garden (£100,000); Higgs & Hill, Lambeth, London.

London.—(EAST HAM).—Houses (25), Lawrence Avenue; W. E. Edwards. (FINCHLEY).—Twelve shops and flats, Falloden Way; Greater London Properties, Ltd. (GOLDERS GREEN).—Library; U.D.C. surveyor, Hendon, N.W. (HORNSEY).—Municipal Offices; borough engineer. (MILL HILL).—Library; U.D.C. surveyor, Hendon, N.W. (POPLAR).—Municipal offices, Fairfield Road (£130,000); borough engineer. (ST. MARYLEBONE).—Houses; St. Marylebone Housing Association, Ltd. (SOUTHWARK).—Town hall, public hall, and library, Walworth Road; engineer, Town Hall. (VICTORIA).—Cinema, Buckingham Palace Road; A. G. MacDonald. (WESTMINSTER).—Houses, Chapel Street; F. Etchells. Extensions, Westminster Hospital, Page Street; Trollope, Winckworth & Crump. (KENSINGTON).—New exhibition hall at Olympia (£1,500,000); J. Emberton.

Lowestoft.—Houses (32), Colville Road; G. A. Gaze. Elementary school, Notley Road (£14,500); borough engineer.

Luton.—Methodist Church, Beech Hill; trustees, Methodist Church, Beech Road.

Maidstone.—Offices, Sessions House, for C.C. (£50,000); county architect.

Manchester.—Flats and garages, Sussex Avenue, Fog Lane, Didsbury (electrical installations); H. O. Mortimer, builder, 12, Buckingham Road, Cheadle, Hulme, Stockport. Extensions to Hill's Restaurant, Market Street (electric lighting installations); J. Gerrard & Sons, Ltd., builders, Swinton.

Middlesbrough.—R.C. Church (£7,000), Marton Road; F. Spink, builder, Fairfield Road, Bridlington.

Milton (WESTON-SUPER-MARE).—Church; secretary, Baptist Church, Weston-Super-Mare.

Monkseaton (NORTHUMBERLAND). — Railway station for L.N.E.R.; Engineers' Office, York Station.

Newburn-on-Tyne.—Houses (111); C. F. Murphy, architect, Newgate Street, Morpeth.

Newcastle-on-Tyne.—Houses (1,000), Gosforth; Messrs. Cussins, Ltd., builders and contractors, Wellburn Estate.

Newton-le-Willows.—Engineering works, Collins Green, for Burtonwood Motor Engineering Co., Ltd. (electrical installations); Williams & Co., 36, Hall Street, St. Helens.

Northampton.—Houses (100), Abingdon Estate; borough engineer.

North Shields.—Houses (23), Balkwell Lane; W. Stockdale, architect, 73, Howard Street.

Nottingham.—Church for Rev. A. B. Short, Church of Our Lady, Bulwell (electrical installations); C. A. Edeson, architect, "Killinagh," Berryhill Road, Nottingham Road, Mansfield.

Peebles.—Cinema for syndicate; A. G. MacDonald, architect.

Penzance.—Houses (162), Penalverne; borough surveyor.

Peterborough.—Houses (180); city surveyor. Housing scheme for the City & Borough Housing Corporation, Ltd.; S. W. P. Pooles, secretary, 45, Priestgate.

Portsmouth.—Houses (36), Highbury Avenue; C. & W. Mitchell.

Ramsgate.—Hotel (£150,000), for F. P. Walter, 222, Strand, W.C.; H. H. Stroud, architect, 37, High Street.

Reading.—School, Whitley Park Housing Estate (£14,922); Building & Public Works Construction Co., Ltd., Swindon.

Repton (DERBY).—R.C. church; Fr. J. Degen, rector, Swadlincote.

Ripon (YORKS).—Churches, Middleton and Hawksworth; H. B. Smith, secretary, Leeds Church Institute, Albion Place, Leeds.

Romford.—Church (£10,000), on main road; secretary, Salem Baptist Church.

Rothesay.—Houses (40); master of works.

Rugeley.—Houses (39); U.D.C. surveyor.

Scarborough.—Houses (32); R.D.C. surveyor.

Selby (YORKS).—Houses (53), Portholme Mill site; H. Boot & Sons, Ltd., Moore Street, Sheffield.

Sevenoaks.—Methodist Church, Otford; trustees.

Sheffield.—Houses (100), Cross Lane and Lydgate; F. A. Ridal, 8, Cobden View. Houses (50), Walders Avenue, Wadsley; T. Barker, 83, Sandford Grove Road.

Shirley (SURREY).—Nine shops, Upper Shirley Road; T. Crump.

Solihull.—Senior school, Sharman's Cross (£13,589); S. F. Swift & Sons.

Southport.—Technical college, for the Borough E.C.; Mr. Cruikshank, architect.

Staffordshire.—Senior school (240 places), Norton Canes, for County E.C.; director of education, Stafford.

Stoke-on-Trent.—School, Belmont Road (£6,243), and extensions, Bradeley School (£5,340); director of education.

Sunbury.—Houses (96); U.D.C. surveyor.

Swadlincote (STAFFS).—R.C. church; Fr. J. D. Degen, rector.

Thorpe Bay (ESSEX).—Church of St. Augustine's (£12,000); Dawson, Son & Allardyce, architects, Clock House Chambers, Barking.

Truro.—Hotel, Tregolls Estate; Mr. Wheatley, architect.

Wallsend.—Houses (64), Churchill Street; Battle Hill Estate Co.

Warwick.—Extensions, poor law institution (£5,000); county architect.

Washington (DURHAM).—Houses (48), Heworth Road; R. J. Swaddle, U.D.C. surveyor.

West Westmorland.—Houses (44); Messrs. Baines, Ltd., builders, Kendal.

Whitehaven.—Houses (120), Woodhouse; borough surveyor.

Whitley Bay (NORTHUMBERLAND).—Cinema and shops, Broadway; P. L. Browne & Sons, architects, Pearl Buildings, Newcastle.

Widnes (LANCS).—Factory, Foundry Lane, for W. Oldroyd & Sons, Ltd., Ditton.

Wigtownshire.—School, Stranraer, for E.C.; clerk, Education Committee, Stranraer.

Windsor.—Houses (20), Vale Road, for F. P. Scott.

Wolverhampton.—Houses (136), Bushbury Estate (£37,284); A. M. Griffiths & Son, Ltd.

Worthing.—Extensions, Swandean Hospital (£16,850); borough surveyor.

York.—Re-erection of business stores, Coney Street, electrically equipped, for Leak & Thorp (£50,000).